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SURVIVAL RATE OF MOTOR VEHICLES
IN PAKISTAN

NTRC-90

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CHAPTER-I

INTRODUCTION

INTRODUCTION

In this sub-continent road transport started assuming importance only after the first World War. The motor vehicles act of 1914 was the first all India enactment, for controlling the motor vehicles. This act did not differentiate between motor vehicles used for hire and privately owned vehicles. Moreover, there was no distinction between different types of motor vehicles. As this act was not sufficient to meet the requirements. Consequently, it was decided that in order to provide a more appropriate legislation the act of 1914 should be replaced by a more comprehensive legislation.

2. Prior to 1945, road transport was exclusively run by private operators. During the post-war period, the number of vehicles and quantum of traffic started multiplying. In 1945 the Government of Punjab decided to step into the field of road transport in order to organise and establish the transport industry on a sound footing. A public transport service was undertaken on a small scale in Lahore and Rawalpindi as well as a number of inter-city routes. Later on it was extended throughout the Province under phased programme. The other Provinces also drew plans to initiate similar schemes. It was introduced in the NWFP in 1948, Sind followed suit in 1950.

3. In 1951 the motor vehicles act of 1939 was amended, empowering the Provincial Governments, to constitute road transport boards to regulate the growth of public sector road transport. The three Provinces viz Punjab, NWFP and

Sind implemented this decision. In 1957 all the three Boards were amalgamated into the West Pakistan road transport board. This Board continued to function till early 1963, when it was felt that the arrangements were cumbersome and they unduly inhibited the growth and operation of public sector road transport in its efficient running. Consequently it was decided to change the set-up of the board to an autonomous Corporation w.e.f. 17th May, 1965.

4. With the dissolution of one unit in June, 1970. This Corporation was also dismembered into three separate road transport Corporations in the Provinces of Punjab, Sind and NWFP. From February, 1977 two Urban Transport Corporations were organized to smooth out urban transportation a sector confronting a multitude of problems. The Punjab Urban Transport Corporation is responsible for city bus services in Lahore and Rawalpindi, while Karachi Transport Corporation tackles the problems of bus transport operations in the Karachi Metropolitan Area. It is also serviced by private bus Companies.

5. The present day society is highly dependant on transportation in every walk of life, we need it for getting to work, for providing food, for recreation and for much more. The modes of transportation, however, depend upon the resources available with the community. In early days, there were no means available, people used to walk for very long distances, presently nations have a variety of transportation modes, e.g. automobiles, trains, aeroplanes, ships, bicycles and others.

6. The development of transport is playing a major role in social and economic uplift of the peoples on this earth. The significance of transport to the normal life of a country and its development lies fundamentally in the fact that mobility and accessibility are essential to the achievement of nearly every other aspects of economic growth. Transport plays an important role in making land more productive, in marketing farm products, in exploiting minerals and forests, in developing new industries and in export and import trade. It is also a critical element in achieving social objectives, in the successful implementation of health and education programmes and in cultural exchanges.

7. Increased mobility has contributed to development not only by increasing domestic and international trade, but by establishing contacts among different peoples and nations. Peoples of the World have become aware of the poverty or prosperity of other lands and there is a desire to lessen the gap between the rich and poor nations. Every field of activity has been affected by a more rapid evolution of thought and a greater capacity to act on an international basis. It has helped the man to think his way and work out his way out of bondage of poverty and despondency.

8. The experience has shown that transport has played a major role in economic uplift and development. In many cases, lack of transport has been the major missing element impeding progress. But provision of transport facilities do not always set off development. Projects, built on the assumption that development will follow, have led to costly

disappointments at the cost of other sectors of economy which would have benefitted more from the wasted investment in transport. Knowing when, where and under what circumstances, investment in transport will make a positive contribution is the fundamental question for the transportation economist.

9. Transportation is not a sector, but a link among other sectors of development and the justification in providing transport lies in serving as an input to development. It is an essential input of mobility and access on which depends the success or failure of the development effort. Providing transport is not like meeting other needs of food or education. Food is necessary to live, and education is necessary to live well but transport is necessary only to the extent that it helps people to eat, to become educated or to achieve some other economic or social objective or gain.

10. The growth of transportation demand is closely related to economic growth and development. A variety of measures can be used to express both transport and economic growth. Statistics on the subject are inadequate for accurately measuring the correlation between growth in transport and economic production. It has been observed that the ratio of changes in transport volume to changes in gross domestic product generally vary by a factor greater than one. It is evident that transport demand will continue growing, in close relation with, but at a faster rate than, gross domestic product.

11. The transport activity is both a cause and an effect to economic activity; Thus, while increased investment or improvement in transport infrastructure will not necessarily

lead to increased economic growth, economic activity can be constrained by in-adequate transport capacity. At the same time, some transport demand may be reduced without adversely affecting total domestic out-put. In fact, reducing transport demand in certain cases may enhance domestic out-put by allowing resources to be allocated toward more productive activities. In addition, improved use of existing capacity can save resources and contribute not only to efficiency within the transport sector, but to over-all growth and efficiency as well.

12. The primary objective of transportation planning is to plan the best possible system given the available resources of land, money, materials and energy. As long as fuels are abundant and inexpensive, the major criteria for transportation planning are probably the initial capital cost and convenience. However, as energy costs rise and energy resources become scarce, increasing attention has to be given to the question of energy use in transportation. Even in the developed countries, the significance of fuel consumption has increased in the 1970's as a result of diminishing supplies of hydro-carbon fuels. It is evident that availability of these fuels may become the deciding factor in selecting a system of transportation for the future.

13. During initial stages of development an increase in GNP will be reflected by a considerably larger increase in freight traffic. In developed countries, the growth of traffic tends to parallel the growth of GNP. But because of changes in technology, in food processing, sources of

energy and communications, the future may see an economic environment in which higher standard of living will be achieved with less proportionate increase in transport volume. The developing countries should, however, aim at approaching more rapidly the parallel relationship between economic growth and transport volume. However, ultimately, it may be possible for developing countries to achieve more wealth with less transport through use of latest technology.

14. The Government of Pakistan has persistently strenuous efforts to provide the people with fundamental socio-economic requirements in spite of the fact that the financial resources for national development is drastically limited. It has consistently placed a great emphasis upon the integrated development of socio-economic activities of the nation and in order to strengthen such activities, has been spending about 1% of GDP or about 16% of total public sector investment on the development of transport sector annually. During the last four five year plan periods approximately one-fifth of all public sector outlay was allocated to the transport sector. The development of transport and communication infrastructure claim an investment of about Rs.83.5 billion out of total plan outlay of Rs.490 billion for the Sixth Plan period 1983-88. It includes Rs.57.5 billion for ADP and public corporations and Rs.26 billion for the private sector. It is evident that Pakistan spends on the said sector a little more than an economy of the same size. Much larger investment are still needed to meet the growing needs of this sector.

15. The transport demand has to be worked out from the

economic trends and objectives of development to be achieved. Knowing these, attempts can be made to determine how much transport is called for, where it is needed and what kind of mode and carrier it should be. It is not an easy task, providing mobility is not like producing steel bars when stacks of steel bars pile up in Yards, some one will see that more bars are not rolled in the mills. But a country can go on for years providing more transport than it needs and there will be no way to see transport surpluses to suggest a change in course. Unused transport facilities cannot be shut down like a factory and it is easy to repeat the same mistake in some other location. The pay offs from transport have been spectacular but so have the losses.

16. Transport Operations also create capital, and this may or may not be used to support further development. If transport services can be made to earn an excess of revenues over costs, the net return may be used for improvement and additions, or paid into the public treasury to support other development activities. In practice, take the case of highways, whose users rarely pay enough taxes to cover the annual cost of the road. But private operators of trucks and buses often do make a profit, which may be invested in additional equipment to expand operations or in other business activities. Generally speaking, improved transport makes profits for other economic activities and the financial returns from providing greater mobility may not appear on the books of the transport facility.

17. To translate traffic into transport needs, aggregate demands for transport can be estimated from the top down on

the basis of economic indices, over all traffic trends, and production targets. Estimates of demand for specific routes and areas, however, require knowledge of the location of economic localities, source of supply and markets.

18. The basic policy proposed in the 5th Five Year Plan that private sector shall developed and extended their business actively, shall continue to be maintained in road passenger transport and in consideration of the fact that the purpose of private sector is the pursuit of profit, it would be appropriate that semi-public sector shall keep a certain share for the sake of social welfare in Road Passenger Transport.

19. A second type of development impact resulting from transport investment is the creation of supporting industries to supply materials and equipment for the transport system. These industries in turn may promote and support other economic undertakings. For example, petroleum refining capacity or the production of crushed stone may contribute to manufacturing and construction as well as to transport. Road building will create a demand for cement production and road transport may introduce tyre manufacturing, the production of parts and the assembly of vehicles.

20. Pakistan like most other countries, has been following a pattern of development which is based on low cost energy and, therefore, low cost transport. The rate of growth of passenger and goods traffic in Pakistan has been much higher than the rate of growth of population and of gross national product. The passenger and goods traffic carried by rail and road transport taken together, increased by

156 percent and 255 percent respectively during the period from 1971-72 to 1984-85.

21. Transport cost have risen enormously in recent years due to the rise in the prices of oil and have thus made the old patterns of development very costly. High costs of transport have increased the cost of development and of the production of goods all round.

22. Among the surface transportation means, motor vehicle transportation plays an important role because of its mobility, door to door servicibility and reliability. The number of vehicles on road increasing year after year. Especially after 1975-76, light vehicles for passenger such as Rickshaws, Motor Cycles, Motor Cars, Jeeps and Taxies which mainly engage in Urban Transport are increasing quite rapidly almost at an average annual growth rate of 15.7% from 1974 to 1983.

23. On the contrary, the increasing ratio of buses is not so high but steady in comparison with the light vehicles. As a result, the number of buses was doubled in 1983 from 1974. The number of trucks is increasing at an average annual growth rate of 9.5%, while light commercial vehicles such as pick-up and van are increasing quite rapidly at an average annual growth rate of 13.7% from 1971-72 to 1979-80.

24. The last few decades have witnessed a tremendous increase in the number of motor vehicles all over the world. This growth has been accompanied by a shift to lesser energy efficient modes of transport. Simultaneously, the improvements in the methods of road construction and maintenance

have resulted in expansion of hard surfaced road networks. The two together have placed at the disposal of mankind greatly increased abilities to move at higher and higher speeds and over wider geographical areas.

25. The passenger road transport in Pakistan is being shared by both the semi-public and the private sector. Every transporter in the private sector, either in the form of a Company or individual operator, comes under control of the transport authorities in each provincial government. The semi-public transport operators for urban transportation come under the jurisdiction of the Federal Government and therefore the inter-city transport fall into the administration of Provincial Government. These are 5 semi-public Corporations those responsible for the Urban Transport.

26. The Road Transporters in freight transportation are to be divided into private and semi-public sectors. The truck operators of private sector are supposed to be licenced and authorized by the transport authority in each province. In semi - public sector, there is only one body providing the freight road transport namely NLC.

27. The required number of vehicles by type in 2000 for passenger transport are estimated to be 8,000 for bus 62000 for motor car and wagon. Similarly the required number of vehicles for road freight transport is estimated to be 14000 in 2000. In order to keep up with the accelerated increase in the traffic demand in each mode of transport, intensive development plan is required.

28. Pakistan is no exception to the above. During the last 1/3rd of a century, the length of hard surface roads has increased from 8,000 Km in 1947 to 43600 Km in 1983 - a more than 5 times increase. The number of motor vehicles on road have increased from 30,000 in 1947 to more than 951,000 in 1983 - an increase of more than 32 times. This has tremendously increased geographical coverage and speed of movement of vehicular traffic in the country. The importance of vehicular traffic has therefore increased considerably for policy and planning purposes.

29. The need of the study was felt because no data regarding Life Span of Motor Vehicles under the prevailing conditions was available for planning purposes. The Fifth Plan document has, however, assumed a life - time of Ten years for buses and trucks for estimating their requirements during the plan period. But the reliability of these figures had not been established because different agencies had given different figures. In view of the above, it became important to determine the life-span of various types of motor vehicles and their parts thereof. The Survival Rate of various types of motor vehicles would indicate the useful life of various types of motor vehicles on our road network. The objective of this study is to determine the life expectancy of different types of motor vehicles in the country which would be helpful for a realistic assessment of the requirements of motor vehicles for future planning.

30. The Report has been organized into Four Chapters, which are given as follows. The Chapter-1, gives the main

Introduction to the Transport System in the Country. It consists of historical background of the vehicular traffic role played by transport in socio-economic development and objectives of the study. Chapter-II, provides methodology adopted for the study. Chapter-III, indicates the Life Span Parameters of motor vehicles which can help us to determine the useful life of various types of motor vehicles. Chapter-IV, gives the Analysis of the Data, through which inferences can be drawn. Chapter-V, illustrates the main conclusions drawn and recommendations based on these conclusions.

CHAPTER-II

METHODOLOGY USED FOR STUDY

METHODOLOGY USED FOR STUDY

SIZE OF SAMPLE:

The method of data collecting was to get the basic data from the Provincial Excise and Taxation Departments. For this purpose, all the Motor Vehicles registered during the First quarter of the calendar year 1961 in the districts of Rawalpindi and Lahore were selected. Each vehicle was identified by its type, Make, Model, Chassis No. and Registration No. The basic information in respect of 2826 motor vehicles was collected. After having completed the basic information in respect of Col. 1-5 from Excise and Taxation Offices Lahore and Rawalpindi the respective owners of vehicles as per their addresses obtained from Excise and Taxation Offices Lahore and Rawalpindi had to be located for collecting the information regarding Col's-6 and 7 through interview method. It was considered preferable to contact the present/latest owner of the vehicles first and try to record as much information as possible regarding vehicle and then try to trace the earlier. Every vehicle was traced through succeeding years with regard to its ownership, use, engine overhaul, body overhaul till 1982 or the date when it actually went off the road (which-ever was earlier) and was completely struck off from the record and disposed off as junk.

The total number of forms collected from Excise and Taxation Offices Rawalpindi and Lahore was 2826. Out of which the 963 forms, were of such type, for which efforts had been made and the forms, had been filled-in completely. In order

to collect the required information, the total number of owners of vehicles to be interviewed was again 963; Out of which 336 persons were from Rawalpindi area, where-as the remaining 627 were from the Lahore area and thus the detailed information in respect of 963 Motor Vehicles was collected. The base year population was comprising of those Motor Vehicles, which had been registered in a particular quarter during the year (say 1961). The Enumerators had attempted to track the whereabouts of those motor vehicles (by type), which had been registered in the country in 1961 and recorded the number of years it had plied on our road net-work before it had been withdrawn either due to the fact that it had:-

- (i) Outlived its "useful life".
- (ii) Met with some accident, etc.

Every effort was made by the survey staff from the beginning to collect the information from a sample of persons. The persons concerned were not pre-informed. The survey was restricted to two districts only and had been undertaken on "Pilot Basis" to establish the viability of expanding the area under coverage based on the availability and quality of data maintained by the concerned departments. If attempts prove to be fruitful, the scope of the study would be further increased to the important cities of Pakistan.

QUESTIONNAIRE PREPARATION:

The questionnaire is a funnel through which flows all the information from its source to its ultimate use. In this case, only one questionnaire was designed and completed. The

forms were printed in sufficient number to cover the entire survey. Like others, this questionnaire has also two parts (a) Identification items and (b) questions related with the survey. These questions were grouped together, each one was leading to next. The sequence has been given to the case of processing. The persons responsible for processing the data were consulted at an early stage of designing the questionnaire. The quality of the final report and the findings of the survey should not exceed that of the questionnaire.

PRE-TESTING OF QUESTIONNAIRE:

Designing an adequate questionnaire is a difficult task. To assure that the questions are properly framed to elicit the desired information. It was proposed that the survey teams should visit the office of the Excise and Taxation Departments, and the Pakistan Post Offices both at Rawalpindi and Lahore to discover whether the requisite information was available in the these offices or not. It was confirmed from relevant records that the required information was available in these offices. After this a number of vehicles owners were also interviewed. On the basis of a careful analysis of the results of the pre-test, the questionnaire was reviewed and revised. The following steps were considered necessary for pre-testing:

1. It involved the interviewers who carried out the actual survey.
2. The pretest sample was taken as representative of the same overall situation as the one for the study.
3. Close supervision was ensured.
4. It involved more than one interviewers.
5. It was carried out through regular notes and recordings and not depending on memory.

6. It was done much before the actual data collection efforts.
7. The complete questionnaire was tested.

ADJUSTING/REVISING THE QUESTIONNAIRE:

The problems identified during the pre-testing were reviewed and necessary adjustments or changes were made in the questionnaire before using it for actual data collection.

PREPARATION OF INTERVIEWER'S MANUAL:

The interviewer's manual is a guide for the interviewers which tells them the appropriate manner in which the interview was to be conducted. It was prepared sufficiently ahead of the initiation of the field operation. It covered broadly the following:

- I. A brief description of the study, aims and objectives and its importance.
- II. Principles of interviewing (its importance, its relation with the project, general attitude of interviewers, rapport building, sequence of questions, respecting interviewers privacy, customs, traditions, draw-backs of probing questions) and be courteous, polite and maintain confidentiality.
- III. Question by question objectives, their explanation and other necessary information related to the work of interviewers. In order to achieve good results of the survey a separate manual of instructions was prepared which is given as under:

MANUAL OF INSTRUCTIONS FOR FILLING UP THE QUESTIONNAIRE:

The following instructions had been followed while filling up the questionnaire forms for the collection of information regarding the above study.

1. The information regarding 'Type of Vehicle' 'Registration No.' 'Engine No.' 'Chassis No.' 'Model' and Column-1 to Column-5 had to be collected from the respective Excise and Taxation Departments. All entries had to be made in chronological order and at least one

line or more lines were reserved for each year. If required, more than one questionnaire form were used for recording the information.

- i) Column One: Enter the year in which the vehicle was registered.
- ii) Column-Two: Enter the month in which the vehicle was registered.
- iii) Column Three: Name and address of the owner of the vehicle on whose name the vehicle was/is registered had to be recorded.
- iv) Column Four: The place of the Registering Authority with whom the vehicle had been registered had to be entered.
- v) Column Five: The purpose for using the vehicle like public use, private use, office use etc. were entered.

After having completed the information in respect of Cols. 1-5, the respective owners of vehicles as per their addresses had to be traced out for collecting the information regarding Cols. 6 and 7 through 'interview method'. It was deemed more useful and manageable to first contact the latest owner of vehicle and then try to get as much information as possible regarding the vehicle. The terminal date after which the vehicle went off the road, alongwith the reasons which, should be record unambiguously. The reasons for a vehicle to go off-road were of the following types.

- i) Went off-road due to an accident.
- ii) " " " non-availability of spare parts, etc.
- iii) " " " maintenance problem.
- iv) Went off-road due to excessive use.
- v) " " " due to any other reason.

(Please specify the reasons)

It had been noted that while, filling up column 6 and 7 of the questionnaire, each entry or information was recorded against the appropriate year e.g. If the Engine or Body overhauling of his vehicle was done in the year 1967, it had been entered against the row for the year, 1967. It was deemed better to record even the month.

Any information considered necessary - in connection with the survey was recorded in Column-8. The specimen copy of the filled up questionnaire clearly had indicated the type of information as was desired to be recorded in this Column.

The interviewer had to record his name and sign the proforma stating the time date and full postal address of the 'place of interview' where the interview had actually been conducted. In case, the place of interview did not change in the subsequent questionnaire, the interviewer had only to record the serial number of the questionnaire having the exact address of the place of interview.

DATA COLLECTION (FIELD OPERATION):

Human beings always observe and as such questions are raised which need to be answered. The observations made by various individuals generate data. Regardless of the source or methodology used for collecting data, the interviewer in each study has to consider what must exist between observer and the observed and how to establish such relationship.

In this case, the field staff was organised in one group of four persons and they were asked to visit the Excise and Taxation Departments at Rawalpindi and Lahore in order

to get the basic information in respect of Col's 1-5 of the questionnaire. All the motor vehicles registered during the first quarter of the Calendar year, 1961 in the district of Rawalpindi and Lahore were selected. The base year information pertaining to 1961 was recorded in respect of those vehicles which were registered in the Excise and Taxation Offices at Rawalpindi and Lahore. Each vehicle was identified by its type, Make, Model, Chassis No. and Registration No. Keeping in view that the Pakistan Post Offices keep record of Motor Cars and Motor Cycles whereas the record in respect of remaining types of vehicles is maintained by the Excise and Taxation Departments were the entire information is consolidated.

The total number of forms collected from Excise and Taxation Offices, Rawalpindi and Lahore was 2826. Out of which 1547 forms were related to Rawalpindi and 1279 forms were concerned with Lahore. Out of the total number of forms, 401 forms had incomplete addresses, 28 forms were of type for which no effort could be made, again 780 forms were of the type in respect of which vehicles had shifted outside the city. The remaining 1617 forms were of the type where efforts had been made, and the progress has been achieved.

After collecting the basic information in respect of Col's 1-5 of the questionnaire. The survey team started the second round of data collection in respect of Col's 6 and 7. Each vehicle was traced through the succeeding years with regard to its ownership, use, engine overhaul, body overhaul till 1982 or the date when the vehicle actually went off the road (which-ever is earlier) and was completely struck off from the

record and disposed off as junk. The Enumerator was asked to visit/contact each and every vehicle owner present/earlier as provided in the sample. Accordingly he tried to contact the present/latest owner first before going to the earlier owners of a particular vehicle. This provided year-wise detailed information for a particular vehicle.

The total number of forms was 1617 where efforts were made by the survey team. Out of which, 963 forms were of the type which had been completely filled in, 606 forms were of the nature where owners had shifted to unknown places while the remaining 48 forms were of the kind where owners refused to give information.

It was also desirable that Col's-6 and 7 of the questionnaire must give the mileage at which engine/body overhauling was actually carried out. Previously these columns had not been filled in adequately even in the case of 'completed' proformas as it does not indicate the mileage at which engine/body overhauling was done. No doubt it was an important piece of information. The field work was completed in a specified time period according to the time schedule. It was highly desirable that the Enumerator knew the criteria by which to determine for whom to collect data. He had to explain the purpose of the survey whenever so desired and indicated that he wished to ask a few questions. It was usually found that the majority of respondents accepted the brief explanation and answered the questions willingly, but the Enumerator were prepared to answer questions about the survey, if asked. He had to assure the respondent that the information will be confidential and that

only total figures, not names, will be published. The Enumerator had to strive to keep harmonious relations with the respondent while at the same time would have tried to get accurate and complete information.

It was decided that in the remarks column of the questionnaire. It must be pointed out whether the information provided by the owners of the vehicles as based on memory or record book. It appeared that in almost all the cases, the information was based on memory and thus it was considered difficult to gauge the accuracy of such information. But considering that engine/body overhauling was not needed in the earlier years, the information pertaining to these two items, was relatively recent. The Enumerator was provided with an introductory letter issued by the Chief, National Transport Research Centre which had to be shown to the owner of the vehicles if so desired. If addresses of the owners recorded from the Excise and Taxation Office registered had to be completed to the maximum, because the possibility of getting the information by mail could also to be explored if needed. If it proves successful, in further, the same method was to be used for collecting the information from many other cities.

The data collection from the vehicle owners was a difficult task in view of the following reasons:-

- (i) Several owners had to be contacted for collecting information for a single vehicle due to change of several ownerships.
- (ii) Addresses were incomplete in some cases and the name of roads had also changed since then so that the survey team had to put in a lot of efforts before the person concerned was contacted.

- (iii) The previous owners had also changed their places of residence in some cases and it became difficult to get their new address (which may or may not be in Rawalpindi).
- (iv) In some cases, the vehicles got transferred to other cities and then against transferred to Rawalpindi. This resulted in "information gaps" for the period for which the vehicle remained outside Rawalpindi.
- (v) About 42 percent of the vehicles (422 in number) have actually been transferred to other places throughout Pakistan as per distribution given below:-

(a)	Punjab	262	Vehicles in 17 Districts			
(b)	NWFP	73	"	"	6	"
(c)	Sind	65	"	"	3	"
(d)	Baluchistan	8	"	"	1	"
(e)	Azad Kashmir	14	"	"	2	"
	TOTAL:-	<u>422</u>	=====			

In addition, the information in respect of about 500 more vehicles was to be collected for the year 1961 from the Excise and Taxation Office, Rawalpindi (Col's 1 to 5 of the questionnaire).

SPECIAL PROBLEMS ENCOUNTERED IN ENUMERATOR:

- (a) Listing Error: Since the accuracy of the list has an important bearing on the technical excellence of the survey all such errors were corrected and called to the attention of the officer incharge.
- (b) Call Backs: When an interview was not obtained on the first call at a specific place, the Enumerator left a card of identification there so that the respondent could communicate with the enumerator to arrange for a future meeting. For this purpose, the enumerator obtained the full address of the vehicle owner and thus it became easy to call the vehicle owner to get the required information.
- (c) Refusal to Cooperate: In order to keep the refusal rate to a minimum every effort was made to persuade the respondent for reply.

INTERVIEWING WRONG PERSON:

Substitution of one person for another was not permissible because it would introduce an unknown biases into the survey.

(B) ADMINISTRATIVE ASPECTS OF THE FIELD ENUMERATION:

- I. Payment to Enumerators: The Enumerator were paid full time TA/DA and Taxi Charges as admissible under the rules, depending upon the administrative set up of the survey.
- II. Transportation of Enumerators:
Provision of Taxi Charges was made for Enumerators to move from one place to another with a minimum of lost time.
- III. Plans for Measuring Performance:
A careful record was kept of the work assigned and completed by each Enumerator. Standard of performance established so that each Enumerator may clearly understand what was expected and required of him.
- IV. Control of Progress of Work:
The Supervisory staff had the function of seeing that field work started on time, continued on schedule, and was completed by the end of the enumeration period. At the end of each day the amount of completed work was noted.

EDITING OF DATA:

Editing of schedule or filled in proforma consisted of careful inspection to detect any errors and omissions, inconsistencies and/or incompleteness in the data. It also involved and checked on whether data was reasonable, uniform and ready for tabulation. In this case, each schedule was edited twice, once in the field after the day work was over and other at the headquarter. Editing was made in a distinctive colour to avoid confusion between the editor's entries and that of the Enumerator. The routine editing was done in the field office every day after the day work was over. This practice facilitated a contact with the respondents without any delay. Particularly in case when there was a need for the re-interview. The editing, in general, is carried out to

ensure the following:-

- (a) Completeness.
- (b) Legibility.
- (c) Comprehensiveness.
- (d) Consistency.
- (e) Uniformity.
- (f) Reasons for non-response.
- (g) Coding.

CODING:

Coding is the assignment of numbers, letters or other symbols to the answers on the questionnaire. The purpose of coding is to classify the answers of all questions into meaningful categories and thus to facilitate the summary of the data. In this case, no proper codes were assigned due to small size of the sample.

TABULATION:

After the coding process was completed, there emerged a series of tabulations which constituted the findings of the surveys. For this purpose, a tabulation plan was prepared which provided a system in which various informations were sorted, grouped, averaged, rounded, summarized and presented in a way which made the findings most usable, generally speaking, the first tabulations must be in more detail than the tables which ultimately appear in the published report.

The blank tables were prepared to assess the data requirements. They were prepared only to serve as a guide. It is desirable

to circulated them to the eventual data users for suggestions and improvements. After this, a number of tables had been prepared to answer the questions raised at the beginning for which this study was undertaken.

ANALYSIS OF DATA:

The objective of the analysis is to answer the basic questions raised at the problem formulation stage. At the analysis stage, the various relationships in terms of cause and effect were seen. The analysis plan is always directed by the objectives of the study. The final report includes the interpretation of the findings of the survey. In writing the analysis, the requirements of all good writings have to be kept in mind, namely, a logical sequence of topics, clear and easily understood exposition of the ideas.

In this case, on the basis of analysis of data, it can be determined that what were the main reasons for going off-road for different types of vehicles. The rate of deterioration can also be calculated. In addition, the average length of useful life of different types of vehicles can be worked out which would help us to estimate the actual requirements of motor vehicles in the country, both for the present and for the future.

REGISTRATION AND TAX PAYMENT PROCEDURE FORMULATED BY THE EXCISE AND TAXATION DEPARTMENTS:

- I. (i) The particulars of the motor vehicles registered are entered in a prescribed register. The previous history if any is also shown in the last column of this register.
- (ii) Vehicles registered in other districts of the Punjab Province and paying tax in this district are also entered in an other tax register which is maintained for the purpose.

- (iii) The information can be had from the register (i) and above.

Motor tax in respect of commercial vehicles is paid in Excise and Taxation Office and tax in respect of private vehicles i.e. motor cars and motor cycles is paid in the Post Offices. Tax payment intimation by the post offices is sent in a prescribed manner under the post offices scheme. Liaison with the Post Office is not particular in sending the information within the schedule timing.

Notices are issued to the defaulters and recovery proceedings carried out as laid down under Punjab Motor Vehicles Taxation Act, 1958.

- I. In the year 1974 with the Bureau of Statistics Government of Punjab, Lahore.
- II. Details of Input Information is as under:-
 - (a) Information in respect of newly registered vehicles is sent in form MT-1.
 - (b) Information in respect of amendment/transfer of ownership cancellation of registration mark on is given in form MT-2.
 - (c) Counter files of tax tokens issued for payment of motor tax are sent to Computer Cell alongwith statement in Form MT-3.
- III. In return the Computer Cell supplies the upto date data of registered/tax paying/defaulting vehicles to the respective district.
- IV. The input is sent to the Computer Cell in prescribed form on monthly/two monthly basis.
- V.
 - (a) List of defaulters is maintained.
 - (b) Notices are issued to the defaulters and checking and chasing of defaulting vehicles by the Field Staff of the Excise and Taxation Office.

(c) Record is maintained for the vehicles which are declared off-the-road by the owners of the respective vehicles.

A specimen copy of MT-1, MT-2, and MT-3 Forms are given as Annexure Nos. I, II and III. It is, however, pointed that MT-3 Form is a statement alongwith which the counter files of Tax Token are sent. There is no printed form for it.

EXCISE AND TAXATION, GOVERNMENT OF THE PUNJAB
 MOTOR DATA PICK UP FORM M.T.1 (REGISTRATION RECORD)

1	D Code 2-4	Regis Num 5-12	13	Date of Regis 14-19		20	Ownership				21	Name		and	40	41	Address	Add-1 44	Add-2 51	Add-3 61	Add-4 79	80		
	Day	Mon		Year	Govt. 1		S. Govt. 2	Private 3	Diplomat 4	Name-1 21		Name-2 21	40										51	61
1	Fuel 12	Class of Vehicle 15-16				Code Code	Code Code	Previous Regs. Num: if any	21	Maker's Name 17-19		20-21	H Power 22-26	Hp cc	27	Chassis Number 47				48	Engine Number 68			
	Pet 1	Unladen Wt 71-75 (lbs)	Annual Tax Rate 76-79	Tax Assm. Code 80	Code Code					Code Code	21					40	51	61	79		80	48	68	
1	No of Tyres on Axle				Size of Tyre on Axle				Maximum Laden Wt (lbs) 35-39	Maximum Axle Wt (lbs)				Front 40-44	Rear 45-49	Other 50-54	Punched by	Verified by						
	Front 14	Rear 15	Other 16	Front 17-22	Rear 23-28	Other 29-34	Front 40-44	Rear 45-49		Other 50-54														

Checked by _____

S. Checked by _____

EXCISE AND TAXATION, GOVERNMENT OF THE PUNJAB
MOTOR DATA PICK UP FORM M.T.2 (CHANGES)

1	D Code 2-4	Regis Num 5-12	D 13	Date of Changes 14-19	Ind Chng 20	New Name		New Address		
						Name-1 40		Add-1 60		
4	C T	D 13	Date of Changes 14-19	Yr Mon	Canc	New Name		New Address		
						Name-2 40		Add-2 79		
1	Ind Chng 20	D Code 21-23	New Regis Num 24-31	D 32	Data Ownership 33	Class of Veh 34-35	Seat Cap 36-37	New Data A Tax Rate 38-39	Engine Numbr	New Data Exemption
1	20	C T S	Diplomat <input type="checkbox"/> 4	Private <input type="checkbox"/> 3	S. Govt. <input type="checkbox"/> 2	Code	Code	Code	40	60

Filled by _____
 Checked by _____
 S. Checked by _____
 Punched by _____
 Verified by _____

CHAPTER-III

LIFE SPAN PARAMETERS FOR MOTOR VEHICLES

LIFE SPAN PARAMETERS FOR MOTOR VEHICLES

The best vehicle would give good mileage, consume less fuel, cost less on maintenance, be docked for repairs less frequently and make good revenue if it is used for the purpose.

Many factors such as the initial cost, economic life, carrying capacity, MPG, cost of maintenance and repairs, overheads etc. go into the determination of cost effectiveness of a vehicle previously, except for the first two factors viz, initial cost and economic life, the overall effect on cost of most other factors used to be generally only marginally different from one make to another. The change in the economics of maintenance and repairs has resulted in higher operating cost. The following factors are used to determine the life span of various motor vehicles.

- (A) Mileage/utilized hours.
- (B) (i) Types of engines.
(ii) Operating speeds.
(iii) Driver Care.
(iv) Quality of Drivers.
(v) Quality of Roads.
(vi) Repair facilities.
(vii) Servicing schedules.
- (C) (i) Planned maintenance procedures.
(ii) Regular overhauling (Engine/body).
(iii) Proper inspection agency for motor vehicles.

(A) MILEAGE PERFORMANCE:

Mileage covered is a good basic indicator of vehicle performance and utilization. Daily, monthly, yearly and life time mileages reflect the usefulness of a vehicle. Good mileage means that a vehicle has stayed on road most of the time, been docked for fewer days in workshop and has been utilized efficiently in service on the road. In case of a bus, efficient bus utilization demand good mileage in the shorter possible time. It is not profitable to maintenance of a bus for a longer period as cost of its maintenance and repairs become un-economic with age.

(B) (I) TYPE OF ENGINES:

In Pakistan, there are a number of different types of Engine makes on road. There are only five bus makes which are considered to be the most suitable for intercity and urban operations namely Fiat, Bedford, Mogurt, BLMC and Isuzu. Similarly bedford is the most popular engine make for trucks. In case of Car, there are a number of Car engine make like M. Benz Chevrolet, Morris, Fiat, Datsun, Volk Wagon etc. but Toyota Corolla is the most popular make. Suzuki (Car and Van) is also gaining popularity in the country because it is giving good mileage, consume less fuel.

(II) OPERATING SPEED:

The speed of movement is central to many problems of transport. For example, the highway operating speeds, among other things, effect the following:

- (a) Vehicle operating costs and through them investment in construction and improvement of highways.

- (b) Wear and tear of roads and thereby cost of maintenance.
- (c) The design and strength of road and bridge structures.
- (d) Flow of traffic and capacity of the roads.
- (e) Travel times and operating schedules of public service vehicles.
- (f) Inter-Modal distribution of traffic.
- (g) The size of road markings, traffic signs and signals.
- (h) Traffic management and safety measures.

The users, operators and public agencies responsible for planning, development, regulation and control of transport services are all interested in vehicle operating speeds. Such an interest might have been due to their concern for safety of other users. However, with increasing use of motor Vehicles, other operational and economic considerations have assumed greater importance.

Operating speeds are affected by a large number of factors including type of vehicle, condition of road, volume of traffic, composition of traffic e.g. proportion of slow moving traffic and most important of all, training, experience and behaviour of the driver etc. However, the most important economic and engineering factors affecting the speed of vehicles are the type of road and volume of traffic.

Among other things, the relationship between speed and costs is of particular importance. Various cost components behave differently with change in speed. For example, the

fuel consumption is high both at very low and high speeds and is lowest at medium speeds. Other physical cost components like, oil consumption, wear and tear of tyres, brakes, parts etc. increase with speed. On the other hand. Time based costs like interest, depreciation, wages as well as the value of time for drivers and passengers decrease with increase in speed.

The place of value of time in operating costs is of significant importance. In the developed countries, 30% to 50% costs are in terms of value of time. This is, however, much less in developing countries where per capita income is low. In these countries, physical cost components are more important.

Most of the investments in transport are aimed at increasing speeds of movement and reducing time and cost of travel in general. Particularly, the investment on highways are justified on the basis of savings in vehicle operating costs which vary with speed. Costs and benefits of transport projects are based on operating speed.

SPEED AND WIDTH:

The width of road is one of the most important variable affecting speed. It is a proxy for the quality of road as well. It is observed that speeds of different categories of vehicle increase with width.

SPEED AND VOLUME:

The vehicle speeds are inversely related to volumes of traffic as the volume increases, the speeds will decrease.

WIDTH AND VOLUME:

The width of road and volume of traffic are the two most significant factors affecting the speed of vehicles.

* (iii) DRIVER CARE:

The driver care for a vehicle is very significant factor affecting the life of a vehicle. A vehicle would give good mileage, consume less fuel if it is cared properly by the driver. It is highly desirable that driving skills should be improved by maximum utilization of existing institutes alongwith basic technical know-how i.e. use of brakes and its effect on brake shoes, gear box, rear axle, leaf springs, tyres, passenger comfort and effect of clutch riding, unnecessary gear changes and unnecessary acceleration of engine.

(iv) QUALITY OF DRIVERS:

There is a need to have a minimum standard of knowledge. They must acquire a minimum standard of driving ability and knowledge required for the safe operation of a vehicle. The improvement of skill of the existing drivers can be done by starting a training programmes for them on regular basis. For this purpose, video films of the assemblies can be used. There is a need to set-up a new institute or develop facilities in existing institutions and avail of facilities in training institutions in the country for upgrading skills of middle management level. It is also desirable that the technical staff even upto the level of Officers should be given necessary

training refresher courses at the existing institutes to over-come maintenance inefficiency and to keep them upto date with latest technology development. There should also be provision of building job career through in service training programme. The quality of drivers could be improved by strictly following the test procedure at the time of granting a licence for driving and also taking a test for recruitment. Moreover there should be a regular arrangement of training and retraining of drivers. This will help in avoiding wastage of vehicles by accidents and other wise. A trained driver can surely prolong the useful life of a vehicle with minimum operating cost.

(v) QUALITY OF ROADS:

One of the important factors affecting operating costs including fuel consumption is type of the road. Whether it is carpetted, surface treated, shingle or earth. The questions which usually arise are what are vehicle operating costs on different categories of roads e.g. earth, shingle, matelled, what would be the amount of road-users savings if a road is improved from an earthen road to shingle or from shingle road to matelled.

THE EFFECT OF GRADE ON FUEL CONSUMPTION:

Grade or level of the road is also one of the important variable affecting fuel consumption. On downward slopes, vehicles move with their own gravitational force and consume less fuel. The upward slopes cause more resistance and result

in higher fuel consumption. A vehicle can move on slopes without using fuel at low speed upto a certain extent but when the speed increases the vehicle engine will have to be used for controlling the vehicle at slopes.

(vi) REPAIR FACILITIES:

There should be sufficient quantity of repair facilities available in the country for the maintenance of vehicles but it should be carried out immediately after a defect is noticed because a small defect at the initial stage will lead to bigger one after the lapse of time. All the workshops should maintain a standard of work so that a vehicle may not come to the workshop most frequently. The required parts should be made available in time to carryout effective repairs. This will reduce operating cost of the vehicle and will help to prolong the useful life of the vehicle.

Therefore, it is needed that servicing, washing and other repairs should be done timely, efficiently and spare parts made available in time to carryout proper and effective maintenance. The maintenance expenditure is the most important factor affecting economics of vehicle operation. A vehicle may cost less to buy but higher cost of its spares needed for its maintenance may off set this obvious advantage. A vehicle which may cost less to buy may prove to be the most expensive over its economic life due to higher maintenance cost.

(vii) SERVICING SCHEDULE:

The schedule of Docking, servicing and washing should be prepared and be more strictly observed. This will save the maintenance cost and improve the operational efficiency of the vehicle. Servicing should include through washing inside and outside of vehicle by a detergent. This should be done by the most experienced staff. However if docking area is covered, it will improve the working conditions. The chassis should be thoroughly cleaned and repairs done, if any, on cross members, brake pipes and lighting cables, and treated with anti-corrosive paint and the Body remounted. The vehicle should also be road tested.

(C) (i) PLANNED MAINTENANCE PROCEDURE:

Planned maintenance procedure should be strictly followed. This will Save maintenance cost and will improve the operational efficiency. But it is not being followed particularly in the public sector transport corporations. This is not due to the lack of training and capability on the part of the staff but is due to collection of various type of makes some of which are difficult to maintain and repair because of there un-suitability for conditions in Pakistan. The saving on purchase of new vehicle will be nullified by the loss due to repairs and renewals of spare-parts if correct makes of vehicles are not purchased because the maintenance, repairs and renewal of the spare parts after the first three years of life for most of the vehicle is

tremendous and increases with the age of the vehicle.

The cost of maintenance varies from one vehicle to another and from one make to another also and affects the life performance of the vehicle.

Higher expenditure on maintenance increases the running cost of a vehicle resulting in increased depreciation.

It is desirable that maintenance cost during economic life of vehicle should have to remain in reasonable limits. Therefore, it is needed that servicing, washing and other repairs should be done timely efficiently and spare parts made available in time to carry out proper and effective maintenance.

(ii) REGULAR OVERHAULING (ENGINE/BODY):

The overhauling of the chassis should be done after every 3rd year. Body dismounting if necessary be done and repairs (on body) carried out. Chassis should be thoroughly cleaned and repairs done if any on cross members, brakepipes and lighting cables and treated with anticorrosive paint and body remounted. The vehicle should then be road tested.

(iii) PROPER INSPECTION AGENCY FOR TRANSPORT VEHICLES:

There is a need to evolve an inspection agency for motor vehicles in Pakistan. To start with, it may have two parts/wings one wing may be responsible for the operation of the public sector transportation and other may be concerned with the private sector. It must have a strong technical base with technical staff even upto the level of officers

to over-come the existing deficiencies and to keep themselves upto date with latest technology development. It should have a constant review of vehicle utilization and operating standards. It should be responsible for enforcing regulations and check of motor vehicle utilization. It may function as an institute for coordination of activities for various transport planning, development and operating agencies.

(D) FUEL CONSUMPTION:

Fuel consumption is one of the most important components of vehicle operating costs. The information on various aspects of fuel consumption is equally useful for individual vehicle operators, agencies concerned with regulation and control of transport services, agencies concerned with planning and development of transport services and infrastructure for a variety of purposes including economising in fuel costs, control of supplies of large fleets, the determination of costs and fares for the formulation of policies, concerning pricing, investment, operations etc. Because fuel costs have direct bearing on pricing policies and operating practices of both private and commercial transport vehicles. For private operators fuel costs constitute immediate out of pocket expenses and enter into decision making about the use of a vehicle in the short run. Reliable information on fuel consumption will be helpful in formulating policies concerning pricing and allocation of resources between public and private sectors.

The knowledge about the behaviour of fuel consumption with respect to changes in speed, can lead to operation of vehicles at levels where fuel consumption is minimum. This considerable savings can be affected in the consumption of the fuel in the country. Fuel consumption in actual operating conditions will depend upon the age of vehicle, maintenance condition of the engine, type of road surface, grade, extent of load etc.

(E) LUBRICATING OIL:

Lubricating Oil consumption is function of engine, gear box and differential sizes and mileages. Its fairly accurate estimates can be made as firm data on engine etc, sizes and manufacturers recommendations for changes at certain mileage, are available. Its contribution to overall cost is, quite small.

(F) TYRES WEAR AND TEAR:

The tyres wear and tear depends upon roughness and speed. Road conditions in Lahore and Rawalpindi are almost the same. Average operating speed for different makes are also assumed to be the same. The tyres used by the public sector corporations are supposed to give a service of 40,000 miles. This is the yard-stick adopted by different public sector agencies for change of tyres in the country.

(G) BATTERIES:

The life of the battery is taken as one year in the public sector transport corporations. The batteries

usually used are a set of the 6/12 volts. The battery costs are, generally only slightly different from one make to another and therefore have a little significance in the overall maintenance expenditure for a vehicle.

CLASSIFICATION OF MOTOR VEHICLES:

(1) MOTORCYCLES:

This category includes Motor Cycles, Scooters and Rickshaws.

(2) CARS:

This category includes all motor cars whether for private use or for hire i.e. taxis. Most of the Cars in this country are of small size. Larger cars are few. This is due to higher import duties on larger Cars in Pakistan.

(3) WAGONS:

This category includes Mini Buses, Pickups, Light Commercial Vehicles whether carrying passengers or goods.

(4) BUSES:

Buses on intercity roads are with very few exceptions. Majority of these buses are on long chassis. However, some proportion is of relatively smaller size on short chassis. The registered capacity of the former is 52 passengers and of the latter 42 passengers.

(5) TRUCKS:

Trucks are also mostly bedford. They have maximum loading capacity of ten tons.

CHAPTER-IV

ANALYSIS OF DATA

ANALYSIS OF DATA

It is of vital significance that various parameters used for planning are precisely quantified in accordance with the scientific procedure laid down in order to formulate a realistic plan. But it is observed that the various parameters used for planning purposes in our country normally do not depict the actual state of affairs on account of certain reasons. The earlier transportation plans based on these parameters were unable to estimate the exact quantities required to meet a particular situation which could result in the wasteful allocation of scarce resources and hence a great loss to the national economy. In this connection, attempts have been made in the NTRC to develop reliable parameters in accordance with the prevalent conditions. NTRC had already undertaken a number of studies for developing certain indices which could be important for plan formulation purposes.

As a step forward, it was proposed that another study may be undertaken to assess the Survival Rate of Motor Vehicles in Pakistan. The need for this was felt because unreliable figures of life span of motor vehicles were available for planning purposes. Different agencies had always provided different figures as average length of life for different vehicles but reliability of these figures had not been established. In view of this, it became important that life span of various types of motor vehicles

may be determined. The Survival Rate of Motor Vehicles would be the true indicator of their useful lives. These figures could be helpful in the estimation of actual requirements of motor vehicles in the country both for present and the future.

The life span parameters for various vehicles should be the mileage/utilized hours and not the number of years lived only. The life of a vehicles depends on the type of engine, operating speeds, driver care, quality of drivers, quality of road, repair facilities and servicing schedule. Moreover the life of a vehicle can be improved through the introduction of strict planned maintenance procedure, regular overhauling and proper inspection agency for transport vehicles.

The present survey had selected a sample of motor vehicles registered during the first quarter of the year 1961 in the districts of Lahore and Rawalpindi. Each vehicle was identified by its type, Make, Model, Chassis No. and Registration No. The vehicle would then be traced through succeeding years with regard to its ownership, use, Engine overhaul and body overhaul for a number of years till 1982 or the date when the vehicle actually went off the road and was completely struck off from the record and disposed off as junk.

As cited above, a number of parameters are necessary to find out the life span of a vehicle. However, due to certain constraints, the present study had confined itself

to the overhauling of engine and overhauling of the body to determine the average length of life of a vehicle. Although it is an indirect indicator but it could be helpful in determining the number of years for which a vehicle had been on the road.

TOTAL NUMBER OF FORMS EXAMINED

S. No:	DESCRIPTION	LAHORE		RAWALPINDI		TOTAL	
		NUMBER OF FORMS	%	NUMBER OF FORMS	%	NUMBER OF FORMS	%
1.	Completely filled In Forms.	627	49.02	336	21.72	963	34.08
2.	Remained untouched.	28	2.19	-	-	28	0.99
3.	Refused to give Information.	26	2.03	22	1.42	48	1.70
4.	Incomplete addresses.	217	16.97	184	11.90	401	14.19
5.	Not located due to wrong addresses.	226	17.67	173	11.18	399	14.12
6.	Shifted to other cities.	75	5.86	705	45.57	780	27.00
7.	Shifted to unknow places.	80	6.26	127	8.21	207	7.32
TOTAL:-		1279	100.00	1547	100.00	2826	100.00

A perusal of the table reveals that the total number of forms examined, during the survey at Lahore and Rawalpindi, was 2826. The number of forms examined at Rawalpindi was 1547 and that of examined at Lahore was 1279 which constitute about 55 and 45% respectively but the number of forms completed

at Lahore was higher than at Rawalpindi. Which formed 65% and 35% of the total respectively. The forms which had been completed at Lahore as 49% of the total number of forms examined at Lahore whereas forms completed at Rawalpindi formed only 21.72% of total number of forms examined at Rawalpindi. Out of the total number of forms examined at both the places 34.08% of forms were completely filled in, 27.6% forms were of those vehicles which had shifted to other cities, 14.19% and 14.12% of forms were of those vehicles which had incomplete addresses and could not be located due to wrong addresses. About 10% of the forms can be classified as 'others' which includes the forms relating to those vehicles which had shifted to unknown places and the owners of vehicles had refused to give information etc.

It is also observed that out of total number of forms examined at Lahore 49.02% is of those which has been completely filled in. Next to this, 17.67% and 16.97% is of those for which owners of vehicles could not be located due to wrong addresses and which had incomplete addresses respectively. The lowest percentage was of those forms which remained untouched.

In case of Rawalpindi, it is evident that maximum number i.e. 45.57% is of the forms for which the owners of vehicles has shifted to other cities and only 21.72% of the forms had been completely filled in. Next to this, 11.9% and 11.18% is of those forms for which the owner of vehicles had incomplete addresses and could not be located due to wrong addresses respectively. The lowest percentage was of those

forms for which the owners of vehicles had refused to give information.

DECAY OF MOTOR VEHICLES

S. NO.	TYPE OF VEHICLES	NO. OF VEHICLES	OFF-THE-ROAD		STILL ON ROAD	
			NUMBER	%	NUMBER	%
1.	Motor Cycle.	295	255	86.4	40	13.6
2.	Motor Car.	255	212	83.1	43	16.9
3.	Motor Cab.	13	11	84.6	2	15.4
4.	Jeep.	55	49	89.1	6	10.9
5.	Truck.	81	77	95.1	4	4.9
6.	Bus(Private).	57	57	100.0	-	-
7.	Bus(G.T.S.).	116	116	100.0	-	-
8.	Motor Rickshaw.	80	79	98.8	1	1.2
9.	Van/Pickup.	11	11	100.0	-	-
TOTAL:		963	867	90.0	96	10.0

From the table above that it is apparent that the total number of vehicles for which complete information had been collected was 963. Out of which 627 proformas were collected from the Excise and Taxation Office, Lahore and 336 forms from the Excise and Taxation Office, Rawalpindi. It is evident that 65% of the work was completed from Lahore whereas remaining part of the information was collected from Rawalpindi. Out of total number of vehicles 90% of them has gone off-the-road during a period of 21 years whereas only 10% of them are still on road. In case of motor cycles, 86% of

vehicles had gone off the road and only 14% of them are still on road.

For motor cars, 83% of them had gone off-the-road and only 17% of them are still on road. Similarly for Buses(Private/G.T.S.) and Van/Pickup the total number of vehicles had gone off-the-road which indicates that these vehicles had a very high rate of decay. This may be due to the fact that these vehicles had been used very roughly and maintained improperly. In case of motor cabs, 85% of them had gone off-the-road whereas only 15% of them are still on the road.

In the category of Jeeps, 89% of them had gone off-the-road whereas only 11% of them are still on road. But for Trucks, 95% of the vehicles had gone off the road and only 5% of them are still on road. This may be due to rough use and lack of proper care. Motor Rickshaw have about 99% of declination rate and only 1% of them are still on road. This was also due to rough use and lack of proper maintenance.

It can be concluded that Bus(Private /G.T.S) and Van/Pickup had totally gone off-the-road during a period of 21 years. Next to this are Motor Rickshaw, Truck and Jeep respectively. The Bus (Private/G.T.S.), Truck and Motor Rickshaw are not getting proper maintenance and required spare parts at the right time. Rough use of these vehicles is very common. The lowest percentage, of decay, is of Motor Cars. This may be due to the fact that Owner/ Drivers of vehicles are providing proper maintenance/care to the vehicles. It is, therefore, desirable that steps should

be taken to improve the maintenance efficiency of the staff-working in the workshops. A separate area for overhauling of chassis should be reserved in the workshop and overhauling of chassis should be done after every 3rd year. The lack of spares is a major reason for the poor productivity of the vehicles. In order to improve the fleet utilization in the public sector it is deemed necessary to take the following steps:-

1. Un-necessary purchase of spare parts on high prices should be avoided.
2. Removal of short-comings in infrastructure facilities available for maintenance and operation of the fleet.
3. To eliminate unrealistic estimates as in the past requiring repair and change of tyres.
4. Complete indifference to maintenance practices should be eliminated.

Thus there is a need to make the optimum use of the bus fleet in the public sector through proper designing of routes and schedules, adequate technical standards of maintenance.

COMPARATIVE STATEMENT SHOWING DECAY OF MOTOR VEHICLES BY TYPE AT LAHORE AND RAWALPINDI.

S. NO	TYPE OF VEHICLES	NO. OF VEHICLE	LAHORE				RAWALPINDI				
			OFF ROAD		STILL ON ROAD		OFF ROAD		STILL ON ROAD		
			NUMBER	%AGE	NUMBER	%AGE	NUMBER	%AGE	NUMBER	%AGE	
1.	MOTOR CYCLE.	142	115	81.0	27	19.0	153	140	91.5	13	8.5
2.	MOTOR CAR.	212	179	84.4	33	15.6	43	33	76.7	10	23.3
3.	MOTOR CAB.	12	10	83.3	2	16.7	1	1	100.0	-	-
4.	JEEP.	40	40	100.0	-	-	15	9	60.0	6	40.0
5.	TRUCK.	45	41	91.0	4	9.0	36	36	100.0	-	-
6.	BUS(PRIVATE).	45	45	100.0	-	-	17	12	100.0	-	-
7.	BUS(G.T.S.)	42	42	100.0	-	-	74	74	100.0	-	-
8.	MOTOR RICKSHAW.	79	78	98.7	1	1.3	1	1	100.0	-	-
9.	VAN/PICKUP.	10	10	100.0	-	-	1	1	100.0	-	-
TOTAL:		627	560	89.3	67	10.7	336	307	91.4	29	8.6

From the table above, it can be observed that 91.4% of the motor vehicle at Rawalpindi and 89.3% at Lahore had gone off-the-road during a period of 21 years. It means that vehicles at Lahore have a longer life than those at Rawalpindi.

In case of motor cycle, 91.5% of the vehicles had gone off-the-road at Rawalpindi whereas only 81% of them had gone off the road at Lahore. It indicates that Motor Cycles had shorter life at Rawalpindi than at Lahore. Similarly for motor car, 76.7% of the vehicles had off the road at Rawalpindi whereas 84.4% of the vehicles had gone off the road at Lahore which shows that Motor Cars have longer life at Rawalpindi.

For motor cab, the rate of going off-the-road is almost equal in both the cities but the only visible difference is that there was a very small sample at Rawalpindi. In case of Jeep, 60% of the had gone off the road at Rawalpindi as compared to 100% of the vehicles of the same category had gone off the road at Lahore which indicates that jeeps have a longer life at Rawalpindi. In case of Trucks, 100% of the vehicles had gone off the road at Rawalpindi whereas 91% had gone off the road at Lahore which indicates that Trucks had a longer life at Lahore. Similarly for Buses (Private/GTS.), the 100% of the vehicles in both the cities had gone off the road. Again similar situation was observed for Motor Rickshaw and Van/Pickup at both cities.

It can be concluded that the overall rate of going decay of motor vehicles is higher at Rawalpindi than at Lahore which means that vehicles have a longer life at Lahore but this difference is quite negligible. It is also apparent that the rate of decay of motor cycles is faster at Rawalpindi than at Lahore but in case of jeep the position is just the reverse. In case of motor car, the rate of going off-the-road is higher at Lahore than at Rawalpindi but in case of truck the position is opposite to it. In case of Bus(Private/G.T.S.), Motor Rickshaw and Van/Pickup the rate of going off-the-road is almost equal in both the cities. There is a negligible difference in the rate of going off-the-road for motor cabs in both the cities. The picture is not very clear because the average life of total number of vehicles at Lahore is

longer than at Rawalpindi. But when we examine each case independently, it appears that some vehicles have longer life at Lahore whereas the others have a longer life at Rawalpindi. The motor cycles, motor cabs and trucks have a longer life at Lahore whereas motor car and jeep have a longer life at Rawalpindi. Buses(Private/GTS) and Van/Pickup have almost equal length of life at both the cities.

DECLINATION RATE OF MOTOR VEHICLES IN PAKISTAN

S. NO.	TYPE OF VEHICLE.	AVERAGE DECLINATION RATE DURING THE				ANNUAL COMPOUND DECLINATION RATE
		1ST 5 YEAR	2ND 5 YEAR	3RD 5 YEAR	4TH 5 YEAR	
1.	MOTOR CYCLE.	0.62	5.76	13.50	17.24	9.08
2.	MOTOR CAR.	0.64	6.34	10.54	15.48	8.13
3.	MOTOR CAB.	-	1.59	16.06	16.74	8.53
4.	JEEP.	1.12	13.63	6.36	19.73	10.01
5.	TRUCKS.	1.27	7.31	20.04	25.13	13.34
6.	BUS(PRIVATE).	1.82	14.33	24.21	47.97	20.12
7.	BUS(GTS.)	1.06	55.13	-	-	30.87
8.	VAN/PICKUP.	-	6.17	24.21	-	10.74
9.	RICKSHAW.	1.55	14.91	31.44	27.52	18.83
TOTAL:-		0.89	9.90	13.95	17.77	10.40

As indicated above, the Annual Compound Declination rate for all types of vehicles in Pakistan was 10.4% during a period of 21 years. This rate was very low during the 1st

five years but increased very rapidly with the passage of time. This rate started from 0.89% during the first five years and reached to 9.9% during the second five years and went up to 17.8% during the 4th five years period. It is evident that it has gone up from 0.9% to 17.8% during the period of 20 years.

In case of motor cycle, the annual compound decay rate was 9.08% during the period of 21 years. It was 0.6% during the 1st five years and again it was 5.8% during the 2nd five years and it rose to 17.2% during the 4th five years period. It can be seen that the declination rate had increased from 0.6% to 17.2% during a period of 20 years. Similarly for motor cars, it is apparent that the decay rate during the 1st five years was 0.6% and it grew up to 6.3% during the 2nd five years and ultimately rose to 15.5% during the 4th five years period. It is evident that declination rate of motor cars had increased from 0.6% to 15.5% during the period of 20 years. However the overall annual compound declination rate during the period of 21 years had been estimated at 8.1%.

Similarly motor cab, the decay rate was almost negligible during the 1st five years. It increased very nominally during the 2nd five years and jumped up to 16.1% during the 3rd five years and ultimately ended with a steady growth rate to 16.7%. It was also observed that there was no appreciable growth in the declination rate between the 3rd and 4th five years period. However, the overall annual compound declination rate was 8.5% during the period of 21 years.

It can be seen that for jeep, the decay rate during the 1st five years was 1.1% and it jumped rapidly to 13.6% during the 2nd five years period. Again it had a sharp fall to 6.4% during the 3rd five years and it had again suddenly rose to 19.7% during the 4th five years period. However, the overall annual compound declination rate during the period of 21 years was 10%.

Similarly for Trucks, it can be observed that the declination rate of this category of vehicles was 1.3% during 1st five years and it rose to 7.3% and again jumped to 20.0% during the 3rd and ultimately it reached to 25.1% during the 4th five years period. It was also seen that the decay rate had rapidly increased from 1.3% to 25.1% during a period of 20 years. It was also observed the declination rate was very high during the 3rd and 4th five years period. The overall annual compound declination rate during a period of 21 years was 13.3%.

In case of Bus (Private) the decay rate during the 1st five years was 1.8%. It suddenly rose to 14.3% during the 2nd five years and ultimately it went up to 48% during the 4th five years period. It is also clear that the highest percentage of decay occurred during the 4th five years period. It was next to the highest percentage of decay observed among all types of vehicles during the 20 years period. The overall annual compound declination rate during the period of 21 years was 20.1%. For the Bus(GTS), the decay rate was in the beginning i.e. 1.1% during the 1st five years. It shoot up to 55.1%

during the 2nd five years period, It is observed that all the Buses(GTS.) had gone off-the-road during a period of 1st ten years. The overall annual compound declination rate for Bus(GTS.) was 30.9%. This category of vehicles had the highest rate of declination among all types of vehicles. Which may be due to the fact that these vehicles are getting very poor maintenance and non-availability of spares at the right time and provision of bus makes which were un-suitable for conditions in Pakistan. Moreover a number of buses had been burnt during the students agitations these vehicles were also being very roughly used.

There was no apparent declination during the 1st five years in case of Van/Pickup but 6.2% decay rate was recorded during the 2nd five years, It jumped up to 24.2% during the 3rd five years period. Then there was no appreciable decay during the 4th five years period. However, the overall annual compound declination rate was 10.7% during a period of 21 years.

In case of Rickshaw, the decay rate during the 1st five years was 1.6%. It jumped to 14.9% during the 2nd five years and ultimately touched to 31.4% during the 3rd five years period. Again a fall was recorded during the 4th five years period. The overall annual compound declination rate was 18.8% during the period of 21 years. This high rate of declination may be due to the fact that these vehicles are facing a grave problem of rough use and improper maintenance.

It can be concluded from the above that declination rate during the 1st five years for all types of vehicles

was quite low. It had a normal rising trend during the 2nd five years period except for the GTS. Buses which touched to the peak during this period. The Buses belonging to GTS. went off-the-road during the 1st ten years period. It was also seen that the annual compound declination rate for Buses (GTS.) was the highest. Next to it were Buses (Private), Motor Rickshaw, Trucks respectively. All other vehicles had only a slight difference in the annual compound declination rate.

It was also indicated that the Bus(Private) had very high decay rate during the 4th five years period. The Rickshaws and Trucks can be ranked 2nd during the same period.

It is also evident that motor cab and van/pickup had negligible decay rate during the 1st five years period. The Motor Cycle and Motor Car had also low declination rate during the 1st five years but had a gradual rising trend during the 2nd five years period.

The Bus(GTS.), Rickshaw, Bus(Private) and Jeep had a low decay rate during the 1st five years period. But there was a jump in the decay rate during 2nd five years period. Again a fall was recorded for Jeep and also rapid rise in case of Rickshaw and Bus(Private) during the 3rd five years. The rate of decay had suddenly shoot up in case of Jeep and Bus(Private) but faced fall in the case of Rickshaw during the 4th five years period. The Buses (GTS.) had highest declination rate during the 2nd five years

period whereas Buses(Private) had a peak decay rate during the 4th five years period. However, all other vehicles had a steady increase in the decay rate during a period of 20 years which started from 0.9% and ended to 17.8%. However, the overall annual compound declination rate during the period of 21 years was 10.4%..

COMPARATIVE STATEMENT SHOWING DECLINATION
OF MOTOR VEHICLES BY TYPE AND REASONS

S. NO	TYPE OF VEHICLES	VEHICLES WENT OFF THE ROAD DUE TO							
		LAHORE				RAWALPINDI			
		ACCIDENT	SPARE-PARTS	MAINTENANCE	OTHER PROBLEM	ACCIDENT	SPARE-PARTS	MAINTENANCE	OTHER PROBLEM
1.	MOTOR CYCLE.	21.74	23.48	21.74	33.04	22.14	19.29	18.57	40.00
2.	MOTOR CAR.	24.02	7.82	18.44	49.72	24.24	39.39	6.06	30.30
3.	MOTOR CAB	10.00	10.00	50.00	30.00	10.00	20.00	40.00	30.00
4.	JEEP	15.00	15.00	15.00	55.00	44.44	33.33	11.11	11.11
5.	TRUCK	24.39	9.76	7.32	58.54	52.78	8.33	30.56	8.33
6.	BUS(PRIVATE)	20.00	11.11	17.78	51.11	66.67	-	16.67	16.66
7.	BUS(GTS.)	28.57	-	-	71.43	13.51	4.50	4.50	78.38
8.	MOTOR RICKSHAW	16.67	1.28	41.02	41.03	20.00	2.00	40.00	38.00
9.	VAN/PICKUP	20.00	20.00	10.00	50.00	20.00	20.00	8.50	52.50
TOTAL:-		21.60	10.54	20.18	47.68	26.71	15.96	14.66	42.67

From the table above it is evident that a higher number of vehicles had met the accident at Rawalpindi than at Lahore. Similarly a greater number of vehicles had gone off-the-road due to non-availability of spare-parts at Rawalpindi than at Lahore. A large number of vehicles were getting poor maintenance at Lahore than at Rawalpindi. A higher percentage of vehicles had gone off-the-road due to other problems at Lahore than at Rawalpindi.

In case of Motor Cycle it is observed that higher percentage of vehicles had met the accident at Rawalpindi than at Lahore. A greater percentage of the vehicles had gone off-the-road due to non-availability of spare-parts at Lahore than at Rawalpindi. A higher percentage of the vehicles were getting improper maintenance at Lahore than at Rawalpindi.

Similarly for Motor Car a higher percentage of vehicles were getting accident at Rawalpindi than at Lahore. This category of vehicle was facing acute shortage of spare-parts at Rawalpindi than at Lahore. Motor Car are getting poor maintenance at Lahore than at Rawalpindi.

The Motor Cab were facing similar problems at both the cities.

For Jeep a higher percentage of vehicles had met the accident at Rawalpindi than at Lahore. A greater number of vehicles was facing shortage of spare-parts at Rawalpindi than at Lahore. But the maintenance of these vehicles was poor at Lahore than at Rawalpindi.

In case of Truck it is observed that higher percentage of vehicles had met the accident at Rawalpindi than at Lahore. The quality of maintenance is more poor at Rawalpindi than at Lahore. But supply of spare-parts is worse at Lahore than at Rawalpindi.

Similarly for Bus(Private) a higher percentage of vehicles had met the accident at Lahore than at Rawalpindi.

The maintenance position better at Rawalpindi than at Lahore. But the spare-parts supply position is better at Rawalpindi than at Lahore.

For Bus(GTS.), a higher percentage of vehicles had met with accident at Lahore than at Rawalpindi. But the availability of spare-parts and maintenance are worse at Rawalpindi than at Lahore.

In case of Motor Rickshaw and Van/Pickup the position of these vehicles is almost the same in both the cities.

It can be concluded from the above that a large number of vehicle had met the accident at Rawalpindi than at Lahore. A greater number of vehicles had gone off-the-road due to non-availability of spare-parts at Rawalpindi than at Lahore. The highest percentage of vehicles were getting poor maintenance at Lahore than at Rawalpindi.

It also observed that the higher percentage of Bus(Private) had met the accident at Rawalpindi than at Lahore. Next to this were the Trucks and Jeeps respectively which were registered at Rawalpindi. The maximum number of Cars and Jeeps registered at Rawalpindi had gone off-the-road due to non-availability of spare-parts. Next to this were the Motor Cycle registered at Lahore.

The maximum number of Truck had been getting poor maintenance at Rawalpindi. Next to this were the Motor Cycle registered at Lahore.

The maintenance position better at Rawalpindi than at Lahore. But the spare-parts supply position is better at Rawalpindi than at Lahore.

For Bus(GTS.), a higher percentage of vehicles had met with accident at Lahore than at Rawalpindi. But the availability of spare-parts and maintenance are worse at Rawalpindi than at Lahore.

In case of Motor Rickshaw and Van/Pickup the position of these vehicles is almost the same in both the cities.

It can be concluded from the above that a large number of vehicle had met the accident at Rawalpindi than at Lahore. A greater number of vehicles had gone off-the-road due to non-availability of spare-parts at Rawalpindi than at Lahore. The highest percentage of vehicles were getting poor maintenance at Lahore than at Rawalpindi.

It also observed that the higher percentage of Bus(Private) had met the accident at Rawalpindi than at Lahore. Next to this were the Trucks and Jeeps respectively which were registered at Rawalpindi. The maximum number of Cars and Jeeps registered at Rawalpindi had gone off-the-road due to non-availability of spare-parts. Next to this were the Motor Cycle registered at Lahore.

The maximum number of Truck had been getting poor maintenance at Rawalpindi. Next to this were the Motor Cycle registered at Lahore.

It can be easily seen that the rate of accident was higher at Rawalpindi, whereas the maintenance of vehicles is poor at Lahore. The higher percentage of vehicles had gone off-the-road due to non-availability of spare-parts at Rawalpindi than at Lahore.

STATEMENT SHOWING DECLINATION OF MOTOR VEHICLES BY TYPE AND REASON

S. No	TYPE OF VEHICLES	VEHICLES WENT OFF THE ROAD								TOTAL					
		ACCIDENT		SPARE-PARTS		MAINTENANCE		OTHER-PROBLEMS		OFF-THE-ROAD		STILL ON ROAD		TOTAL	
		NUM-BER	%	NUM-BER	%	NUM-BER	%	NUM-BER	%	NUM-BER	%	NUM-BER	%	NUM-BER	%
1.	MOTOR CYCLE.	56	18.98	54	18.31	51	17.29	94	31.86	255	86.44	40	13.56	295	100.0
2.	MOTOR CAR.	51	20.00	27	10.59	35	13.73	99	38.82	212	83.14	43	16.86	255	100.0
3.	MOTOR CAB.	2	15.38	-	-	5	38.46	4	30.77	11	84.62	2	15.38	13	100.0
4.	JEEP.	10	18.18	9	16.36	7	12.73	23	41.82	49	89.09	6	10.91	55	100.0
5.	TRUCK.	29	35.80	7	8.64	17	17.28	27	33.33	77	95.06	4	4.94	81	100.0
6.	BUS(PRIVATE).	17	29.82	5	8.77	10	17.54	25	43.86	57	100.00	-	-	57	100.0
7.	BUS(G.T.S.)	22	18.97	3	2.59	3	2.59	88	75.86	116	100.00	-	-	116	100.0
8.	MOTOR RICKSHAW.	14	17.50	1	1.25	32	40.00	32	40.00	79	98.75	1	1.25	80	100.0
9.	VAN/PICKUP.	2	18.18	2	18.18	1	9.09	6	54.55	11	100.00	-	-	11	100.0
TOTAL:-		203	21.08	108	11.21	158	16.41	398	41.33	867	90.03	96	9.97	963	100.0

REASONS OF DECLINATION:

From the table above it is indicated that 90% of the vehicles had gone off-the-road due to certain reasons during a period of 21 years. Out of which 21.1% had met the accident, 16.4% could not get proper maintenance and 11.2% due to non-availability of spare-parts. However, a large number of the vehicles had gone off-the-road due to other problems. Out of which 23.3% of the vehicles had been auctioned mostly belonging to GTS. or other public sector agencies. About 13% of these vehicles had been shifted to Kabari shops. In addition,

there was also a number of other reasons due to which the vehicles had gone off-the-road like high cost of maintenance, rough use, failure of engine, burning, went to junk, sold to mechanic and theft.

In case of motor cycle, it is observed that 86.4% of the vehicles had gone off-the-road due to certain reasons during a period of 21 years. Out of which 18.98% had met the accident, 18.3% went off-the-road due to non-availability of spare parts and 17.3% could not get proper maintenance. Besides this, 31.9% of the vehicles had gone off-the-road due to other problems. Most of these vehicles had gone off-the-road due to failure of engine, rough use, high cost of maintenance went to Kabari shop/Junk, sold to mechanic and theft.

The maximum number of the vehicles in this category had faced accident and acute shortage of spare-parts.

Similarly for motor car, it is evident that 83% of the vehicles had gone off-the-road due to certain reasons during a period of 21 years. Out of which 20.0% had met the accident, 13.7% could not get proper maintenance, 10.6% were off-the-road due to non-availability of spare-parts. Besides this, 38.8% had gone off-the-road due to other problems.

It is pointed out that these vehicles were registered in first quarter of 1961 and were of different makes/models. They have now disappeared from the market because of high cost of maintenance, rough use, failure of engine, theft

and went to Kabari shop/junk. Moreover, there is no proper supply of spare-parts for these vehicles because importers, of spare-parts for these makes/models, do not find enough business and thus supply/demand of these spare-parts is very limited. In addition, to this, there is no proper arrangement for the maintenance of these old vehicles.

For motor cab, 84.6% of the vehicles had gone off-the-road due to certain reasons during a period of 21 years. Out of which 38.5% could not get proper maintenance. Which may be either due to lack of proper care on the part of drivers or lack of proper facilities available for maintenance 15.4% of the vehicles met the accident. In this case none of the respondents had indicated that there is lack of spare-parts. it means that sufficient quantity of spare-parts is available in the market for this category of vehicles. In addition, 30.8% of the vehicles had gone off-the-road due to other problems as cited above.

In case of Jeep, 89.1% of the vehicles had gone off-the-road due to certain reasons during a period of 21 years. Out of which 18.2% faced the accident, 12.7% could not get the proper maintenance and 15.4% were off the road due to non-availability of spare-parts. Besides this, 41.8% of the vehicles had gone off-the-road due to other problems.

Similarly for Truck, it is seen that 95.1% of the vehicles had gone off-the-road due to certain reasons during a period 21 years. Out of which 35.8% met the accident, 17.3% could not get proper maintenance and 8.6% were off-the-road

due to non-availability of spare-parts. It is, however observed that 33.3% of vehicles had gone off-the-road due to other reasons. Among all types, the maximum number of Trucks had met the accident during this period,

For Bus(Private), It is evident that 100% of the vehicles had gone off-the-road due to certain reasons for a period of 21 years. Out of which 29.8% of the vehicles met the accident, 17.5% could not get proper maintenance and 8.8% were off-the-road due to non-availability of spare parts. Moreover, 43.9% of the vehicles had gone off-the-road due to other problems which includes high cost of maintenance, rough use, failure of engine, went to Kabari shop and sold to mechnic. Next to the highest, number of vehicles which faced the accident belonged to this category.

The Inducement required by this sector consists of access to credit, access to comprehensive insurance and a revision of bus fares from time to time according to the prevailing conditions in the country. It is learnt that Banking Council has not yet accepted the demands for credit by the private transport operators. It is suggested that bus companies be registered under the Companies Act as private limited company with a minimum bus fleet of 25 standard size buses. It is also recommended that the transportation sector may be treated as an industrial sector and any loans made available should be at the rate charged to industry by PICIC and IDBP.

Similarly for Bus(G.T.S.) 100% of the vehicles had gone off-the-road due to certain reasons during the period of 21 years. Out of which 19% had met the accident, 2.6% got poor maintenance and again 2.6% were off the road due to non-availability of spare-parts, 75.9% had gone off-the-road due to other problems which can be enumerated as auction, burning, and rough use, which often had happened during students agitations, went to junk/Kabari shop, failure of engine. Moreover, an inefficient management and planning of operations is often seen in the public sector corporations.

Apparently it appears wrong to say that 2.6% of the vehicles had gone off-the-road due to poor maintenance and again 2.6% of the vehicles were off-the-road due to non-availability of spare-parts. Probably this may be due to some data limitations because the survey team had collected the data from the available official records which might had some in built biases. Which were difficult to remove on the spot.

It is generally believed that maintenance of G.T.S. vehicles is not as efficient as in the private sector. The consumption of fuel by the government buses is higher than private buses. Although differences are partly due to the fact that public sector buses are relatively old and worn out and partly due to the fact that their maintenance and engine setting are not proper. The Government Transport Services do not have a regular schedule of replacement and renewal of buses. The addition of stock is very discontinuous. There are adverse operation conditions of G.T.S. in competition of with private sector.

In case of Van/Pickup, 100% of the vehicles had gone off-the-road due to certain reasons during the period of 21 years. Out of which 18.2% met the accident, 9.1% could not get proper maintenance and again 18.2% were off-the-road due to non-availability of spare-parts. 54.67% of the vehicles had gone off-the-road due to other problems.

For Motor Rickshaw, 98.8% of the motor vehicles had gone off-the-road due to certain reasons during the period of 21 years. Out of which 40.0% could not get proper maintenance, 17.5% met the accident and 1.3% were off-the-road due to non-availability of spare-parts. 40% had gone off-the-road due to other problems which can be enumerated as rough use, high cost of maintenance, failure of engine, went to Kabari shop and theft.

It can be concluded from the above that 100% of the Bus(Private), G.T.S. and Van/Pickup had gone off-the-road during a period of 21 years. Next to this were the motor rickshaw and trucks respectively. The lowest percentage is that of the motor car which had gone off-the-road during the same period. This may be due to proper care on the part of the owner/driver for the vehicles. It is also observed that maximum number of trucks had met the accident. Next to this is Bus(Private) which met the highest number of accidents. The lowest percentage was of those vehicles which met accident is that of motor cab. The maximum number of motor cycle went off-the-road due to non-availability of spare-parts. Next to this were Van/Pickup and Jeep respectively. The

lowest percentage was that of motor rickshaws which faced decay due to non-availability of spare-parts.

Similarly maximum number of Motor Rickshaw and Motor Cab had gone off-the-road due to non-availability of proper maintenance respectively. Next to this were the Bus(Private), Motor Cycle and Truck respectively. The lowest percentage of Bus(G.T.S.) which were not getting proper maintenance which apparently appears wrong because non-availability of spare-parts and poor maintenance are very common feature. This may be due to the fact that the data was collected from the available official records which had some in built biases which were difficult to remove on the spot. Similarly the maximum number of Buses of (G.T.S.) had gone off-the-road due to other problems which may include auction, high cost of maintenance, burning and rough use. Next to this, are Van/Pickup which had been facing different problems. In this category the lowest percentage was that of motor cab.

AVERAGE LIFE OF MOTOR VEHICLES-RAWALPINDI & LAHORE

S. NO	TYPE OF VEHICLES	LAHORE			RAWALPINDI				
		NO. OF VEHICLES	AVERAGE LIFE (IN YEARS)	STANDARD DEVIATION	CO-EFFICIENT OF VARIATION	NO. OF VEHICLES	AVERAGE LIFE (IN YEARS)	STANDARD DEVIATION	CO-EFFICIENT OF VARIATION.
1.	MOTOR CYCLE.	142	14.10	4.59	32.55	153	13.17	4.77	36.22
2.	MOTOR CAR.	212	13.76	4.95	35.97	43	15.09	5.09	33.73
3.	MOTOR CAB.	12	14.67	3.94	26.86	1	10.00	-	-
4.	JEEP.	40	10.10	3.45	34.16	15	18.20	4.18	22.97
5.	TRUCK.	45	12.64	4.16	32.91	36	10.86	4.36	40.15
6.	BUS(PRIVATE).	45	11.51	3.00	26.06	12	8.42	4.78	56.77
7.	BUS(G.T.S.).	42	7.17	1.31	18.27	74	8.93	1.92	21.50
8.	MOTOR RICKSHAW.	79	9.97	3.01	30.19	1	8.00	-	-
9.	VAN/PICKUP.	10	11.60	3.06	26.38	1	11.00	-	-
TOTAL:-		627	12.43	4.65	37.41	336	12.25	4.93	40.24

AVERAGE LENGTH OF LIFE MOTOR VEHICLES AT LAHORE AND RAWALPINDI:

As indicated in the table above, it is observed that Jeeps had longer life than all other types of motor vehicles which is 18.2 years at Rawalpindi. Next to this, is the motor cars which have an average length of life as 15.1 years at Rawalpindi. The Bus(G.T.S.) had the shortest length of life of 7.2 years at Lahore.

On comparison of average life of all motor vehicles both at Lahore and Rawalpindi, it is evident that the motor cycles

have longer life at Lahore than at Rawalpindi but the difference is not very significant. The motor cars have shorter life at Lahore than at Rawalpindi. Again the motor cab have longer life at Lahore than at Rawalpindi but the difference is very significant. The Jeeps have shorter life at Lahore than at Rawalpindi but again this difference is very significant. Trucks and Bus(Private) have longer life at Lahore than at Rawalpindi. This difference is also very significant. Buses(G.T.S.) have shorter life at Lahore than at Rawalpindi. Van/Pickup have almost equal length of life at both the cities.

It can be concluded from the above that average length of life for motor cycle, motor cab, truck, bus(private), motor rickshaw and van/pickup is longer at Lahore whereas motor cars, jeep, bus (G.T.S.) is longer life at Rawalpindi. However, the overall length of life of all types of vehicles is higher at Lahore than at Rawalpindi.

to be the lackness of definite prospect for the role of semi-public sectors transportation. It is highly desirable that semi-public sector should play an important role in passenger transport. In the private sector, there is no large scale bus owner. Most of them have only one or two buses. This fact some times result in the excessive competition on road to acquire passengers on a next station which eventually lead to very high rate of disastrous traffic accidents. Moreover, there is no loan financed by government to purchase buses. So when private sector wants to purchase some buses, they can not help borrowing money from a private financier with expensive interest. And it is said that this makes them discourage from investment. It is essential that the bus system is conditioned by a number of factors estraneous to the operations of the bus enterprise. Some are obvious like the road net-work, maintenance standards of roads, parking facilities which can be developed based on the road system, traffic laws, competition with other road transport system and indeed a host of other factors implicit in the total environment.

STANDARD DEVIATION:

A measure of spread of individual values around the means is provided by the standard deviation which is defined as.

$$SD = \sqrt{\frac{E(X-\bar{X})^2}{n}}$$

This gives average deviations from the mean. The standard deviation divided by its mean provides the

co-efficient of variation. A statement of standard deviations for different types of vehicles is given in the table above.

It is evident from the above that the standard deviations are between 14.9% and 56.8% of the means. Which indicates that there is wide dispersion between the means.

STATISTICAL COMPARISON OF AVERAGE LIFE OF MOTOR VEHICLES IN LAHORE AND RAWALPINDI:

HYPOTHESIS:

- (i) H_0 :- Average life of motor vehicle at Lahore = Average Life of motor vehicles at Rawalpindi.
 H_1 :- There is significant difference between average life of motor vehicles at the two cities.
- (ii) Significance level 95%
- (iii) Test statistic

$$Z = \frac{\bar{X}_L - \bar{X}_R}{\sqrt{\frac{(S_L)^2}{n_L-1} - \frac{(S_R)^2}{n_R-1}}}$$

\bar{X}_L : Average life of motor vehicles at Lahore.

\bar{X}_R : Average life of motor vehicles at Rawalpindi.

S_L : Standard deviation at Lahore.

S_R : Standard deviation at Rawalpindi.

- (iv) Region of Rejection $|Z| \geq 1.96$

(v) Conclusion: If $|Z|$ greater than tabulated value at 95% then we Reject the hypothesis and we conclude that there is a significant difference between average life of motor vehicle in the two cities i.e. Lahore and Rawalpindi. If calculated value $|Z|$ less than the tabulated. Value 1.96 then we accept the hypothesis that there is no difference in Average Life of motor vehicles at both the cities Lahore and Rawalpindi.

STATISTICAL COMPARISON OF AVERAGE LIFE OF MOTOR VEHICLES BETWEEN LAHORE AND RAWALPINDI

MOTOR VEHICLES	TABLE VALUE AT 95%	CALCULATED VALUE Z	CONCLUSION
MOTOR CYCLE	1.96	1.70	Insignificant difference.
MOTOR CAR	1.96	1.55	Insignificant difference.
JEEP	1.96	6.50	Significant difference.
TRUCK	1.96	1.84	Insignificant difference.
BUS(PRIVATE)	1.96	1.60	Insignificant difference.
BUS(G.T.S.)	1.96	5.79	Significant difference.

The above table simply shows the statistical difference in average life of motor vehicles for difference categories of vehicles at both the cities. It is also evident that there is no difference in average length of life of motor cycle, motor car, truck, and bus (private) between Lahore and Rawalpindi but in case of Jeep and Bus(G.T.S.) the difference is quite significant between Lahore and Rawalpindi.

PROBABILITY OF SURVIVAL AND GOING OFF-
THE-ROAD OF MOTOR VEHICLES.

The probability of Surviving and Going Off-The-Road of Motor Cycle, Motor Car, Jeep, Truck, Bus(Private), Bus(GTS.) and Motor Rickshaw have been worked out and are placed at Annexure-X to XVI. The Survival Rate is different for different motor vehicles. The time interval is taken as one year. Here we have worked out the probability of Going Off-The-Road and Survival year by year, which indicates the trend of Motor Vehicles for Going Off-The-Road after completion of a specified time period and similarly the Survival of Motor Vehicles.

Column-I, indicates the age of a vehicle, Column-II, the actual number of Motor Vehicles at different ages, Column-III, shows the probability of Going Off-The-Road at different ages and Column-IV, indicates the probability of Survival at different ages.

CHAPTER-V

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS AND RECOMMENDATIONS

Pakistan has been following a pattern of development based on low cost energy and therefore on low cost transport. The rate of growth of passengers and goods Traffic in Pakistan has been much higher than the rate of growth of population and of the Gross National Product. The transport cost has risen enormously in the recent years due to rise in the prices of Oil and have thus made the old patterns of development very costly. Thus there is a need for re-examination of the old patterns and evolution of new patterns of development having a minimum transport content. There is also a need to estimate the transport element, in the capital cost and in the cost of operation, while appraising development projects for implementation. In short, the development of patterns which economise on transport may have to be different from those followed in the past.

Roads dominate, inland transportation, for both passengers and freight. In future, the role of roads is likely to remain unchanged. Out of 109.2 billion passenger kilometers of total inter-city traffic in 1984-85 road carried 81.9%. As for freight, an estimated 32.9 billion ton kilometers roads carried 73.3%.

INLAND TRAFFIC

	1971-72	1977-78	1980-81	1981-82	1982-83	1983-84	1984-85
<u>Passenger Kilometer (Million):</u>							
ROAD.	36,520	65,370	65,991	72,437	79,513	84,363	89,452
RAIL.	9,515	13,471	16,311	16,502	16,502	17,312	18,160
AIR DOMESTIC(MPK)	300	1,026	1,205	1,337	1,484	1,510	1,623
<u>Freight Ton Kilometer (Million):</u>							
ROAD.	8,047	12,389	18,207	19,647	21,200	22,620	24,126
RAIL.	7,756	9,332	7,918	8,314	7,500	8,115	8,780
AIR.	5	18	16	17	19	22	24

SOURCE: PLANNING AND DEVELOPMENT DIVISION.

The growth rates for freight/passengers traffic during the last Five Years Plan have been recorded at 6.9% and 4.10% respectively. There has been serious disturbance in the Inter Model Distribution of traffic particularly in respect of freight traffic. There was a decline in railway freight traffic by an average of 4.5% per annum resulting in diversion to the road network of traffic load higher than projected. The shift of freight traffic from rail to road caused road transport system to come under great strain. The situation was further aggravated due to lower than planned induction of trucks by the private sector. The system reached point of break-down where NLC stepped in to save the situation. The main reason for the in-adequate induction

of trucks capacity by the private sector was the exorbitant cost of heavy commercial vehicles and the lower returns on capital investment as compared to light commercial vehicles.

The number of motor vehicles has increased many times during the last more than three decades. This increase has been very spectacular in the case of motor cycle, motor car, jeep wagon and bus have increased by more than seven times and trucks by nine times. Which can be seen from the table below:-

MOTOR VEHICLES ON ROAD IN PAKISTAN

<u>TYPE OF VEHICLE:</u>	<u>1947</u>	<u>1983</u>
Motor Cycle and Scooter.	3618	418,684
Motor Car/Jeep.	15994	228,463
Station Wagon/Tractor.	-	108,544
Bus.	4576	29,300
Motor Cab/Taxi.	928	20,364
Motor Cab/Rickshaw.	-	36,521
Delivery Van.	-	13,134
Private Carrier Truck and Public Carrier Truck	4929	44,539
Others.	532	51,691
	<u>30177</u> =====	<u>951,240</u> =====

It can be concluded from the foregoing paragraphs that Bus(Private/G.T.S.) and Van/Pickup had totally gone off-the-road during a period of 21 years. Next to this were Motor Rickshaw, Truck and Jeep respectively. The Bus(Private/G.T.S.) Truck and Motor Rickshaw were not getting proper maintenance and required spare-parts at the right time. Rough use of these vehicles is very common feature. The lowest percentage of decay is of Motor Cars. This may be due to the fact that Owners/Drivers of vehicles were providing proper maintenance/care to the vehicles. It is also desirable that some steps should be taken to improve the maintenance efficiency of the staff working in the workshops. A separate area for overhauling of chassis should also be reserved in the workshop and overhauling of chassis be done after every 3rd year. The lack of spares is a major reason for the poor productivity of the vehicles. In order to improve the fleet utilization in the public sector it is deemed necessary to take the following steps:-

1. Short-comings in infrastructure facilities available for maintenance and operation of the fleet should be removed.
2. Complete indifference to maintenance practices should be avoided.
3. Un-necessary purchase of spare-parts at high prices should be avoided.
4. Un-realistic estimates as in the past requiring repair and change of tyres should be eliminated.

Thus there is a need to make the optimum use of the bus fleet in the public sector through proper designing of routes and schedules, adequate technical standards of maintenance.

It is also observed that the overall rate of decay of motor vehicles was higher at Rawalpindi than at Lahore which means that vehicles have a longer life at Lahore but this difference is quite negligible. It is also apparent that the rate of decay of motor cycles is faster at Rawalpindi than at Lahore but in case of Jeep the position is just the reverse. In case of motor car, the rate of going off-the-road was higher at Lahore than at Rawalpindi but in case of truck the position is opposite to it. In case of Bus(Private/G.T.S.) Motor Rickshaw and Van/Pickup the rate of going off-the-road was almost equal in both the cities. There was a negligible difference in the rate of going off-the-road for motor cabs in both the cities. The picture is not very clear because the average length of life of all types of vehicles was longer at Lahore than at Rawalpindi. But when we examined each case independently, it appeared that some vehicles had longer life at Lahore whereas the others had a longer life at Rawalpindi. The motor cycles, motor cabs and trucks had a longer life at Lahore whereas motor car and Jeep had a longer life at Rawalpindi. Bus(Private/G.T.S.) and Van/Pickup almost equal length of life at both the cities.

It is evident that declination rate during the 1st Five Years for all types of vehicles was quite low. It had a normal rising trend during the 2nd Five Years Period except for Bus(G.T.S.) had touched to the peak during this period. The Buses belonging to G.T.S. went off-the-road during the 1st Ten years period. It was also seen that the annual compound

declination rate for Buses(G.T.S.) was the highest. Next to it were Buses(Private), Motor Rickshaw, Trucks respectively. All other vehicles had only a slight difference in the annual compound declination rate.

It is seen that the Bus(Private) had very high decay rate during the 4th Five Years period. The Rickshaw and Truck could be ranked 2nd during the same period.

It is also observed that motor cab and van/pickup had negligible decay rate during the 1st Five Years period. The Motor Cycle and Motor Car had also low declination rate during the 1st Five Years but had a gradual rising trend during the 2nd Five Years period.

The Bus(G.T.S.), Rickshaw, Bus(Private) and Jeep had a low decay rate during the 1st Five Years Period. But there was a sudden jump in the decay rate during 2nd Five Years period. Again a fall was recorded for Jeep and also rapid rise in case of Rickshaw and Bus(Private) during the 3rd Five Years. The rate of decay had suddenly shoot up in case of Jeep and Bus(Private) but fall was recorded in the case of Rickshaw during the 4th Five Years Period. The Bus (G.T.S) had highest declination rate during the 2nd Five Years period whereas Bus(Private) had a peak decay rate during the 4th Five Years period. However, all other vehicles had a steady increase in the decay rate during a period of 20 years which started from 0.9% and ended to 17.8%. However, the annual compound declination rate during the period of 21 years was 10.4%.

It is also observed that a greater number of vehicles had met the accident at Rawalpindi than at Lahore. A large number of vehicles had gone off-the-road due to non-availability of spare-parts at Rawalpindi than at Lahore. The highest percentage of vehicles were getting poor maintenance at Lahore than at Rawalpindi.

It also seen that the higher percentage of Bus (Private) had met the accident at Rawalpindi than at Lahore. Next to this were the Trucks and Jeeps respectively registered at Rawalpindi. The maximum number of Cars and Jeeps registered at Rawalpindi had gone off-the-road due to non-availability of spare-parts. Next to this were the Motor Cycle registered at Lahore.

The maximum number of Truck had been getting poor maintenance at Rawalpindi. Next to this were the Motor Cycle registered at Lahore.

It is evident that the rate of accident was higher at Rawalpindi. Whereas the maintenance of vehicles is poor at Lahore. The higher percentage of vehicles had gone off-the-road due to non-availability of spare-parts at Rawalpindi than at Lahore.

It is apparent that 100% of the Bus(Private/G.T.S.) and Van/Pickup had gone off-the-road during a period of 21 years. Next to this were the motor rickshaw and trucks respectively. The lowest percentage is that of the motor car which had gone off-the-road during the same period.

This may be due to proper care on the part of the owner/driver for the vehicles. It is also observed that maximum number of trucks had met the accident. Next to this is Bus(Private) which met the highest number of accident. The lowest percentage was of those vehicles which met accident was that the motor cab. The maximum number of motor cycle went off-the-road due to non-availability of spare-parts. Next to this were Van/Pickup and Jeep respectively. The lowest percentage was that of motor rickshaw which faced decay due to non-availability of spare-parts.

Similarly maximum number of Motor Rickshaw and Motor Cab had gone off-the-road due to poor maintenance respectively. Next to this were Bus(Private), the Motor Cycle and Truck respectively. The lowest percentage was that of Bus(G.T.S.) which were not getting proper maintenance. However, it apparently appears wrong because non-availability of spare-parts and poor maintenance are very common feature in the semi-public sector. This may be due to the fact that the data was collected from the available official records which had some in-built biases which were difficult to remove on the spot. Similarly the maximum number of Bus(G.T.S.) had gone off-the-road due to other problems which may include auction, high cost of maintenance, burning and rough use. Next to this, are Van/Pickup which had been facing different problems. In this category the lowest percentage was that of motor cab.

It can be seen that average length of life for motor cycle, motor cab, truck, bus(private), motor rickshaw

and van/pickup is longer at Lahore whereas motor car, jeep, bus(G.T.S.) had longer life at Rawalpindi. However, the overall length of life for all types of vehicles was higher at Lahore than at Rawalpindi.

AVERAGE LIFE OF MOTOR VEHICLES IN PAKISTAN

S. NO	TYPE OF VEHICLES	NO. OF VEHICLES	AVERAGE LIFE (IN YEARS)	STANDARD DEVIATION	CO-EFFICIENT OF VARIATION.
1.	MOTOR CYCLE.	295	13.62	4.70	34.51
2.	MOTOR CAR.	255	13.98	4.99	35.69
3.	MOTOR CAB.	13	14.38	3.91	27.19
4.	JEEP.	55	12.31	5.13	41.67
5.	TRUCK.	81	11.85	4.32	36.46
6.	BUS(PRIVATE).	57	10.86	3.63	33.43
7.	BUS(G.T.S.).	116	7.83	1.17	14.94
8.	MOTOR RICKSHAW.	80	9.89	3.09	31.24
9.	VAN/PICKUP.	11	11.64	2.91	25.00
TOTAL:		963	12.31	4.77	38.75

It is evident from the table above that motor cabs had longer life than all other types of vehicles. Next to this was the category of motor cars and motor cycle respectively. However the Bus(G.T.S.) had the shortest length of life than all other types of vehicles. This may be due to lack of proper maintenance and non-availability of

spare-parts at the right time and also provision of Bus makes which were unsuitable for conditions in Pakistan. Unstable and discontinuous procurement of vehicles was one of the serious problem, This makes it difficult to carry out a staff and drivers for each Corporation. This seems to be the lackness of definite prospect for the role of semi-public sector should play an important role in passenger transport. In the private sector, there is no large scale bus ownership. Most of the owners have only one or two buses. This fact sometimes result in the excessive competition on road to acquire passengers on a next station which eventually lead to very high rate of disastrous traffic accidents. Moreover, there is no loan financed by Government to purchase buses. So when private sector wants to purchase some buses, they cannot help borrowing money from a private financier with expensive interest. And it is said that this makes them discourage from investment. It is essential that the bus systems conditioned by a number of factors extraneous to the operations of the bus enterprise. Some are obvious like the road net-work, maintenance standards of road, parking facilities which can be developed based on the road system, traffic laws, competition with other road transport systems and indeed a host of other factors implicit in the total environment.

CONCLUDING REMARKS:

- (i) The Bus(G.T.S.) had highest annual compound declination rate. Next to this were Bus (Private), Motor Rickshaw and Truck respectively.

- (ii) A large number of vehicles had met the accident at Rawalpindi than at Lahore.
- (iii) A higher percentage of vehicles had gone off-the-road due to non-availability of spare-parts at Rawalpindi than at Lahore.
- (iv) A greater number of vehicles had gone off-the-road due poor maintenance at Lahore than at Rawalpindi.
- (v) Maximum number of trucks had met the accident. Next to this were Bus(Private). The Motor Cab had faced minimum number of accidents.
- (vi) Motor Cars have the lowest rate of decay. This may be due to the fact that owners/drivers of vehicles might have been providing proper maintenance/care for the vehicles.
- (vii) The average length of life of Motor Vehicles is higher at Lahore than at Rawalpindi but this difference is very in-significant. However, motor cycle, motor cab and truck, Bus(Private), Motor Rickshaw and Van/Pickup have longer life at Lahore, whereas Motor Car and Jeep Bus(G.T.S.) have a longer life at Rawalpindi. The situation is almost the same for all other types of vehicles.
- (viii) The Bus(G.T.S.) had the shortest the length of life than all other types of vehicles. This may be due to poor maintenance and non-availability of spare-parts at the right time and also provision of bus make which were un-suitable for conditions in Pakistan.
- (ix) Motor Cab had longer life than all other types of vehicles. Next to this were Motor Car and Motor Cycle.

For road transport, it is not out of place to emphasize that the basic problems which impinges on the efficiency or other-wise of bus operations, particularly in urban areas, is dichotomy in objectives. On the one-hand, there is no compelling reason why the transport should be picked-up as legitimate activity for public sector investment and operations unless the decision emanates from a basic realization that government are obliged to provide transport as a social obligation and service at least to the indigent

section of the society. If the emphasis is on regarding bus operations as social service then all the problems attendant of un-economic bus fares, concessional operations, operation on un-economic route and many others have to be accepted as un-avoidable even if they have an adverse bearing on operations. If on the other-hand, bus operations are regarded as an enterprise which must earn its keep then management aspects become paramount.

The optimum use of bus fleet through proper designing of routes and schedules, adequate technical standards of fleet maintenance, adoption and implementation of work system not only brings economies in operation and increase revenue but these would give an assurance of clean and efficient public transportation system servicing the needs of the commuter.

It is observed that urban transport is a situation of loss in all most all cases in other countries also. Subsidies are not unique in Pakistan. It is given in the developed and developing countries. Each bus of London Transport is subsidized to the tune of \$ 2000 per annum with a fleet of 6000 buses.

The Private Sector pursue the profit oriented free competition rule and provide their services only to

lucrative routes. During the Fifth Five Year Plan it was proposed that the private sector will continue to maintain its share in road passenger transport and be developed and extend their business actively. In future, role of roads is likely to remain un-changed.

The private sector is playing a very vital role in the movement of goods. There is only one agency in the public sector, namely NLC, working for the transportation of goods, NLC Trucks mainly carry essential commodities such as wheat, rice, fertilizer, cement, sugar etc. and its share is estimated to 5.2%. It has heavy duty trucks, such as full trailers (Mercedez Benz 22 tons) and semi-trailers (Fiat and Hino 20 tons), while private trucks are mainly composed of bedford (7-10 tons).

The performance of road transport in terms of movement of passengers and goods are very significant. Road transport is mainly in the private sector. Its share in the movement of passenger and goods are 81.9% and 73.3% respectively during 1984-85.

The recommendations emerging out of this study have implications both for the transporters as well as the Government Agencies responsible for planning, development and operation of transport sector. The recommendations

can be enumerated as under:

1. The study should be conducted on regular basis at an interval of five years which will help the planners and policy makers to workout the life expectancy of different types of motor vehicles which would be useful for realistic assessment of the requirement of motor vehicles for future planning.
2. There is a need to make improvements in the transport data base. This would only be possible if different surveys are conducted and regular programmes are instituted requiring different agencies to provide information on regular basis.
3. Transport and traffic data should be compiled and stored in computer system and maintained and up-dated periodically.
4. In future, more parameters should be included in the study in order to determine realistic estimate of life expectancy of motor vehicles.
5. The study should cover more big cities in order to have a clear picture of life expectancy of motor vehicles at national level.
6. The study should at least cover two different representative periods to form a time series.
7. Comprehensive measures to highway accidents should be more advanced, through the study of developed countries experiences in view of research, training, regulations, safety facilities, organization and so on.
8. Surveys on the actual conditions regarding organizations, transport inventory, employment and traffic activities of road transport system should be carried out periodically.
9. The study in urban transport systems including a system for through traffic in the major cities should be carried out.

SOME GENERAL RECOMMENDATIONS:

- (1) The transport capacity of existing facilities and equipments should be fully utilized by elimination of their bottle-necks and optimization of their performance efficiency.

- (ii) Encouraging and increasing production and commercial activities and contribution to economic development of the country should be one of the primary aims of the transport system.
- (iii) Private sector investment should be introduced in transport sector to reduce restrictions of public resources and to stimulate the transport activities.
- (iv) Private investment in road transport sector should be encouraged and comprehensive policies may be introduced to promote this sector as an industry through the grasp of actual conditions of this sector.
- (v) Proper amount of budget for maintenance and repair should be allocated to the existing facilities in road transport sector.
- (vi) Transport infrastructure should be developed, not only for meeting the demand of ambitious economic growth but also to offer an efficient service to the people of the country.
- (vii) The public sector should purchase required number of buses every year according to plan, once the share is fixed. This would make it possible to stabilize its managements, which would consequently increase operational efficiency.
- (viii) Road transport should be utilized mainly for short haul for high value cargoes.
- (ix) More attempts should be made to improve operational and maintenance efficiency of public sector road transport.
- (x) The Bus acquisition plan is to be made in longer span, rather than to acquire at once, in order to maintain stable bus service.
- (xi) There is a need to set up a new institute or developed facilities in existing institutions and avail of facilities in training institutions in the country for up-grading skills of middle management level.

VEHICLES REGISTERED FOR THE FIRST TIME IN 1961 AND REMAINED ON ROAD UPTO- ANNEXURE-11

(COMBINED)

Type of Vehicle	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Motor Cycle	295	294	293	292	291	286	280	270	255	231	213	191	162	137	117	103	88	71	58	50	40	40
Motor Car	255	255	253	252	249	247	239	234	212	199	178	167	149	136	120	102	92	75	58	50	44	43
Motor Cab	13	13	13	13	13	13	13	13	13	13	12	10	6	5	5	5	4	4	2	2	2	2
Jeep	55	55	55	55	55	55	51	49	45	25	25	23	22	20	19	18	16	11	10	10	6	6
Truck	81	81	81	80	79	76	74	70	61	56	52	36	30	27	18	17	15	8	7	7	4	4
Bus Private	57	57	57	56	54	52	50	49	44	42	24	21	17	14	11	6	5	2	1	-	-	-
Bus (G.T.S.)	116	116	116	116	114	110	104	87	23	2	2	2	-	-	-	-	-	-	-	-	-	-
Van/ Pickup	11	11	11	11	11	11	11	11	9	8	8	4	3	3	3	2	-	-	-	-	-	-
Rickshaw	80	80	80	79	76	74	72	65	55	41	33	20	13	8	5	5	1	1	1	1	1	1
TOTAL:	963	962	959	954	942	921	894	848	717	617	547	474	402	350	298	258	221	172	137	120	97	96

ANNEXURE-IV

VEHICLES REGISTERED FOR THE FIRST TIME IN 1961 AND REMAINED ON ROAD UPTO-

LAHORE

Type of Vehicle	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Motor Cycle	142	142	142	142	142	140	138	131	127	114	106	97	85	75	64	53	43	35	29	28	27	27
Motor Car	212	212	211	210	207	206	199	195	174	162	141	133	119	111	98	81	73	57	44	38	34	33
Motor Cab	12	12	12	12	12	12	12	12	12	12	11	10	6	5	5	5	4	4	4	2	2	2
Jeep	40	40	40	40	40	37	36	34	30	12	12	10	9	7	6	6	5	-	-	-	-	-
Truck	45	45	45	45	44	43	42	42	39	37	34	22	18	17	12	11	11	5	4	4	4	4
Bus (Private)	45	45	45	45	45	45	43	43	38	37	22	19	15	12	9	4	4	1	1	-	-	-
Bus (GTS)	42	42	42	42	40	36	30	25	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Van/ Pickup	10	10	10	10	10	10	10	10	8	7	3	3	3	3	2	-	-	-	-	-	-	-
Rickshaw	79	79	79	79	76	74	72	65	55	41	33	20	13	8	5	5	1	1	1	1	1	1
Total:-	627	627	626	625	616	603	582	557	485	422	366	314	268	238	202	167	141	103	81	75	68	67

ANNEXURE-VI

RAWALPINDI

VEHICLES REGISTERED FOR THE FIRST TIME IN 1961 AND REMAINED ON ROAD UPTO-

Type of Vehicle	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Motor Cycle	153	152	151	150	149	146	142	139	128	117	107	94	77	62	53	50	45	36	29	22	13	13
Motor Car	43	43	42	42	42	41	40	39	38	37	37	34	30	25	22	21	19	18	14	12	10	10
Motor Cab	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-
Jeep	15	15	15	15	15	15	15	15	15	13	13	13	13	13	13	12	11	11	10	10	6	6
Truck	36	36	36	35	35	33	32	28	22	19	18	14	12	10	6	6	4	3	3	3	-	-
Bus (Private)	12	12	12	11	9	7	7	6	6	5	2	2	2	2	2	2	1	1	-	-	-	-
Bus (GTS).	74	74	74	74	74	74	74	62	21	2	2	2	-	-	-	-	-	-	-	-	-	-
Van/ Pickup.	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-
Rickshaw.	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL:	336	335	333	329	326	318	312	291	232	195	181	160	134	112	96	91	80	69	56	47	29	29

NUMBER OF MOTOR VEHICLES SHIFTED
FROM LAHORE TO OTHER CITIES.

S. NO:	SHIFTED TO	NUMBER OF VEHICLES
1.	BANNU.	1
2.	D. I. KHAN.	1
3.	FAISALABAD.	4
4.	GUJRANWALA.	2
5.	GUJRAT.	1
6.	HYDERABAD.	1
7.	JHANG.	1
8.	JHELM.	2
9.	KARACHI.	11
10.	KOHAT.	1
11.	MARDAN.	2
12.	MIANWALI.	1
13.	MIR-PUR.	2
14.	PESHAWAR.	4
15.	MULTAN.	10
16.	RAHIM-YAR-KHAN.	2
17.	RAWALPINDI.	18
18.	SARGODHA.	4
19.	SHEIKHUPURA.	1
20.	SIALKOT.	5
21.	SUKKUR.	1
TOTAL:-		75

NUMBER OF MOTOR VEHICLES SHIFTED
FROM RAWALPINDI TO OTHER CITIES

S.NO:	SHIFTED TO	NUMBER OF VEHICLES
1.	ATTOCK.	11
2.	BAHAWALNAGAR.	4
3.	BAHAWALPUR.	4
4.	BANNU.	6
5.	D. G. KHAN.	3
6.	D. I. KHAN.	8
7.	DIR	1
8.	FAISALABAD.	21
9.	GILGIT.	2
10.	GUJRANWALA.	7
11.	GUJRAT.	7
12.	HAZARA.	34
13.	HYDERABAD.	11
14.	JHANG.	6
15.	JHELUM.	23
16.	KARACHI.	62
17.	KASHMIR.	21
18.	KHAIRPUR.	1
19.	KOHAT.	5
20.	LAHORE.	139
21.	MARDAN.	17
22.	MIANWALI.	13
23.	MULTAN.	24
24.	MUZAFFARGARH.	1
25.	NAWABSHAH.	2
26.	PESHAWAR.	46
27.	QUETTA.	12
28.	RAHIM-YAR-KHAN.	6
29.	SAHIWAL.	5
30.	SARGODHA.	32
31.	SHEIKHUPURA.	3
32.	SIALKOT.	17
33.	SUKKUR.	2
TOTAL:-		556

PROBABILITY OF SURVIVAL AND GOING OFF-THE-ROAD
OF MOTOR CYCLE

AGE(X)	NUMBER OF MOTOR CYCLE AT AGE(X)	PROBABILITY GOING OFF-THE- ROAD: X TO X+1	PROBABILITY OF SURVIVAL: X TO X+1
0	295	0.01356	0.98644
1	291	0.01375	0.98625
2	287	0.01742	0.98258
3	282	0.01773	0.98227
4	277	0.02166	0.97834
5	271	0.02583	0.97417
6	264	0.02652	0.97348
7	257	0.03113	0.96887
8	249	0.03213	0.96787
9	241	0.04149	0.95851
10	231	0.04329	0.95671
11	221	0.04977	0.95023
12	210	0.06190	0.93810
13	197	0.07107	0.92893
14	183	0.08197	0.91803
15	168	0.09524	0.90476
16	152	0.12500	0.87500
17	133	0.15038	0.84962
18	113	0.19469	0.80531
19	91	0.26374	0.73626
20	67	0.40299	0.59701

PROBABILITY OF SURVIVAL AND GOING OFF-THE-ROAD
OF MOTOR CAR

AGE(X)	NUMBER OF MOTOR CAR AT AGE(X)	PROBABILITY GOING OFF-THE- ROAD: X TO X+1	PROBABILITY OF SURVIVAL X TO X+1
0	255	0.01569	0.98431
1	251	0.01594	0.98406
2	247	0.01619	0.98381
3	243	0.02058	0.97942
4	238	0.02521	0.97479
5	232	0.02586	0.97414
6	226	0.02657	0.97345
7	220	0.03182	0.96818
8	213	0.03286	0.96714
9	206	0.03883	0.96117
10	198	0.04545	0.95455
11	189	0.05291	0.94709
12	179	0.05587	0.94413
13	169	0.07101	0.92899
14	157	0.07643	0.92357
15	145	0.09655	0.90345
16	130	0.11538	0.88462
17	115	0.13913	0.86087
18	99	0.17172	0.82828
19	82	0.23171	0.76829
20	63	0.33333	0.66667

PROBABILITY OF SURVIVAL AND GOING OFF-THE-ROAD
OF JEEPS

AGE(X)	NUMBER OF JEEPS AT AGE(X)	PROBABILITY GOING OFF-THE- ROAD: X TO X+1	PROBABILITY OF SURVIVAL X TO X+1
0	55	0.01818	0.98182
1	54	0.01852	0.98148
2	53	0.01887	0.98113
3	52	0.01923	0.98077
4	51	0.01961	0.98039
5	50	0.02000	0.98000
6	49	0.02041	0.97959
7	48	0.02083	0.97917
8	47	0.04255	0.95745
9	45	0.04444	0.95556
10	43	0.04651	0.95349
11	41	0.04878	0.95122
12	39	0.05128	0.94872
13	37	0.08108	0.91892
14	34	0.08824	0.91176
15	31	0.09677	0.90323
16	28	0.14286	0.85714
17	26	0.15385	0.84615
18	22	0.18182	0.81818
19	18	0.27777	0.72223
20	13	0.46154	0.53846

PROBABILITY OF SURVIVAL AND GOING OFF-THE-ROAD
OF TRUCKS

AGE (X)	NUMBER OF TRUCKS AT AGE(X)	PROBABILITY GOING OFF-THE-ROAD: X TO X+1	PROBABILITY OF SURVIVAL X TO X+1
0.	81	0.01235	0.98765
1.	80	0.01250	0.98750
2.	79	0.01266	0.98734
3.	78	0.01282	0.98718
4.	77	0.01299	0.98701
5.	76	0.01316	0.98684
6.	75	0.02667	0.97333
7.	73	0.02740	0.97260
8.	71	0.02817	0.97183
9.	69	0.02899	0.97101
10.	67	0.04478	0.95522
11.	64	0.04688	0.95312
12.	61	0.06557	0.93443
13.	57	0.07018	0.92982
14.	53	0.09434	0.90566
15.	48	0.10417	0.89583
16.	43	0.13953	0.86047
17.	37	0.18919	0.81081
18.	30	0.26667	0.73333
19.	22	0.40909	0.59091
20.	13	0.76923	0.23077

PROBABILITY OF SURVIVAL AND GOING OFF-THE-ROAD
OF BUS (PRIVATE)

AGE(X)	NUMBER OF BUS(PRIVATE) AT AGE(X)	PROBABILITY GOING OFF-THE- ROAD: X TO X+1	PROBABILITY OF SURVIVAL X TO X+1
0.	57	0.00526	0.99474
1.	56.7	0.00529	0.99471
2.	56.4	0.00709	0.99291
3.	56.0	0.00893	0.99107
4.	55.5	0.01081	0.98919
5.	54.9	0.01274	0.98725
6.	54.2	0.01845	0.98155
7.	53.2	0.02256	0.97744
8.	52.0	0.02885	0.97115
9.	50.5	0.03960	0.96040
10.	48.5	0.04742	0.95258
11.	46.2	0.06494	0.93506
12.	43.2	0.08565	0.91435
13.	39.5	0.11899	0.88101
14.	34.8	0.16954	0.83046
15.	28.9	0.25260	0.74740
16.	21.6	0.42130	0.57870
17.	12.5	0.92000	0.08000

PROBABILITY OF SURVIVAL AND GOING OFF-THE-ROAD
OF BUS (G.T.S.)

AGE(X)	NUMBER OF BUS(G.T.S) AT AGE (X)	PROBABILITY GOING OFF-THE- ROAD: X TO X+1	PROBABILITY OF SURVIVAL X TO X+1
0.	116	0.00862	0.99138
1.	115	0.01739	0.98261
2.	113	0.02655	0.97345
3.	110	0.03636	0.96364
4.	106	0.05660	0.94340
5.	100	0.08000	0.92000
6.	92	0.13043	0.86957
7.	80	0.21250	0.78750
8.	63	0.39683	0.60317
9.	38	0.94737	0.05263

PROBABILITY OF SURVIVAL AND GOING OFF-THE-ROAD
OF MOTOR RICKSHAW

AGE(X)	NUMBER OF MOTOR RICKSHAW AT AGE (X)	PROBABILITY GOING OFF-THE- ROAD: X TO X+1	PROBABILITY OF SURVIVAL X TO X+1
0.	80	0.00375	0.99625
1.	79.7	0.00502	0.99498
2.	79.3	0.00757	0.99243
3.	78.7	0.00889	0.99111
4.	78.0	0.01154	0.98846
5.	77.1	0.01686	0.98314
6.	75.8	0.02111	0.97889
7.	74.2	0.02830	0.97170
8.	72.1	0.04022	0.95978
9.	69.2	0.05347	0.94653
10.	65.6	0.07328	0.92672
11.	60.7	0.10544	0.89456
12.	54.3	0.15654	0.84346
13.	45.8	0.24236	0.75764
14.	34.7	0.41787	0.58213
15.	20.2	0.95050	0.04950

REASONS FOR MOTOR VEHICLES FOR GOING OFF-THE-ROAD-LAHORE

ANNEXURE - XVII

S. NO.	TYPE OF VEHICLES	VEHICLE WENT OFF-THE-ROAD DUE TO				TOTAL				
		ACCIDENT NUMBER	%AGE	SPARE-PARTS NUMBER	%AGE		MAINTENANCE NUMBER	%AGE	OTHER PROBLEM NUMBER	%AGE
1.	MOTOR CYCLE.	25	21.74	27	23.48	25	21.74	38	33.04	115
2.	MOTOR CAR.	43	24.02	14	7.82	33	18.44	89	49.72	179
3.	MOTOR CAB.	1	10.00	-	-	5	50.00	4	40.00	10
4.	JEEP.	6	15.00	6	15.00	6	15.00	22	55.00	40
5.	TRUCK.	10	24.39	4	9.76	3	7.32	24	58.54	41
6.	BUS(PRIVATE).	9	20.00	5	11.11	8	17.78	23	51.11	45
7.	BUS(G.T.S.)	17	28.57	-	-	-	-	30	71.43	42
8.	MOTOR RICKSHAW.	13	16.67	1	1.28	32	41.02	32	41.03	78
9.	VAN/PICKUP.	2	20.00	2	20.00	1	10.00	5	50.00	10
TOTAL:		121	21.61	59	10.54	113	20.18	267	47.59	560

ANNEXURE-XVIIII
REASONS FOR MOTOR VEHICLES FOR GOING OFF-THE-ROAD-RAWALPINDI

S. No.	TYPE OF VEHICLES	VEHICLES WENT OFF THE ROAD DUE TO				TOTAL				
		ACCIDENT NUMBER	%AGE	SPAREPARTS NUMBER	%AGE		MAINTENANCE NUMBER	%AGE	OTHER PROBLEM NUMBER	%AGE
1.	MOTOR CYCLE.	31	22.41	27	19.29	26	18.57	56	40.00	140
2.	MOTOR CAR.	8	24.24	13	39.39	2	6.06	10	30.30	33
3.	MOTOR CAB.	1	100.00	-	-	-	-	-	-	1
4.	JEEP.	4	44.44	3	33.33	1	11.11	1	11.11	9
5.	TRUCK.	19	52.78	3	8.33	11	30.56	3	8.33	38
6.	BUS(PRIVATE).	8	66.67	-	-	2	16.67	2	16.67	12
7.	BUS(G.T.S.).	10	13.51	3	4.50	3	4.50	58	78.38	74
8.	MOTOR RICKSHAW.	1	100.00	-	-	-	-	-	-	1
9.	VAN/PICKUP.	-	-	-	-	-	-	-	100.00	1
TOTAL:		82	26.71	49	15.96	45	14.66	131	42.67	307

OVERHAULING OF ENGINE BODY OF MOTOR VEHICLES(LAHORE)

ANNEXURE-XIX

S. No.	TYPE OF VEHICLES	NO. OF VEHICLES	NUMBER OF OWNERSHIP			ENGINE OVERHAULING			BODY OVERHAULING		
			AVERAGE	S.D.	C.V.	AVERAGE	S.D.	C.V.	AVERAGE	S.D.	C.V.
1.	MOTOR CYCLE.	142	1.94	0.84	45.30	2.24	1.41	62.95	1.61	1.45	90.06
2.	MOTOR CAR.	212	1.82	0.85	46.70	2.07	1.39	67.15	1.80	1.25	69.44
3.	MOTOR CAB.	12	1.33	0.49	36.84	2.67	1.37	51.31	2.42	1.50	61.98
4.	JEEP.	40	1.10	0.38	34.55	1.37	1.19	86.86	1.37	1.17	86.40
5.	TRUCK.	45	1.24	0.53	42.74	2.35	1.23	52.34	2.02	1.47	72.77
6.	BUS(PRIVATE).	45	1.64	0.64	39.02	2.95	1.26	42.71	2.33	0.92	39.48
7.	BUS(G.T.S.)	42	1.00	-	-	1.57	0.74	47.13	2.57	1.08	42.02
8.	MOTOR RICKSHAW.	79	1.86	0.55	29.57	2.54	1.47	57.87	2.01	1.29	64.18
9.	VAN/PICKUP.	10	1.10	0.32	29.09	1.70	0.67	39.41	0.80	0.63	78.75
TOTAL:		627	1.45	0.25	17.24	2.16	0.27	12.50	1.88	0.27	14.36

OVERHAULING OF ENGINE/BODY OF MOTOR VEHICLES IN RAWALPINDI

ANNEXURE-XX

S. NO.	TYPE OF VEHICLES	I.C. OF VEHICLES	NUMBER OF OWNERSHIP			ENGINE OVERHAULING			BODY OVERHAULING		
			AVERAGE	S.D.	C.V.	AVERAGE	S.D.	C.V.	AVERAGE	S.D.	C.V.
1.	MOTOR CYCLE.	153	2.84	1.76	61.97	1.48	0.78	52.70	0.57	0.45	78.95
2.	MOTOR CAR.	43	3.44	2.08	60.46	2.18	1.13	51.83	1.16	0.67	57.76
3.	MOTOR CAB.	1	3.00	-	-	3.00	-	-	1.00	-	-
4.	JEEP.	15	1.27	0.56	44.09	1.33	0.49	36.84	0.20	0.72	355.00
5.	TRUCK.	36	1.69	0.75	44.38	2.19	1.03	47.03	1.44	0.75	52.08
6.	BUS (PRIVATE).	12	2.42	1.88	77.69	2.83	1.30	45.94	1.25	0.67	53.60
7.	BUS (G.T.S.).	74	1.00	-	-	1.29	1.14	88.37	3.01	1.44	47.84
8.	MOTOR RICKSHAW.	1	1.00	-	-	-	-	-	-	-	-
9.	VAN/PICKUP.	1	3.00	-	-	-	-	-	-	-	-
TOTAL:		336	2.30	-	-	1.64	-	-	1.28	-	-

MILEAGE OF BUSES IN PUBLIC SECTOR

ANNEXURE-XXI

S. NO.	MODEL/AGENCY/STATUS	MONTHS ON ROAD	CUMULATIVE MILEAGE	AVG. PER MONTH MILEAGE	12 MONTHS MILEAGE	24 MONTHS MILEAGE	36 MONTHS MILEAGE	40 MONTHS MILEAGE
1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	BLMC, 74/PRTB OFF-ROAD	43	100045	2326	35194	69122	93028	100045(43)
2.	FIAT, 68/PRTB OFF-ROAD	47	129626	2758	44228	83637	113451	129626(47)
3.	FIAT, 67/PRTB OFF-ROAD	53	121323	2289	37076	69826	97324	115173
4.	BEDFORD, 73/PUTC OFF-ROAD	44	95639	2173	35283	65586	87159	95639(44)
5.	BLMC, 73/PUTC OFF-ROAD	53	94817	1789	24717	50045	70776	86824
6.	BEDFORD, 74/PUTC OFF-ROAD	48	114161	2378	33123	60755	89133	114161
7.	FIAT, 67/SRTC OFF-ROAD	70	165593	2365	44243	78645	108835	136317
8.	MOGURT, 75/KTC OFF-ROAD	51	145636	4792	66906	115013	118831	140169
9.	BEDFORD, 72/KTC OFF-ROAD	60	163980	2733	46383	84691	114517	143492
10.	FIAT, 86/NWFP GTS OFF-ROAD	119	237276	1993	49968	98733	133059	164354
11.	BEDFORD, 69 NWFP GTS OFFROAD	84	135426	1612	28041	47287	66235	89102

SOURCE: BUS MAKE STUDY.

FUEL CONSUMED OF BUSES IN PUBLIC SECTOR

ANNEXURE-XXII

S. NO.	MODEL/STATUS	MONTHS ON ROAD	CUMULATIVE MILEAGE	AVG. MPG.	12TH MONTHS MILEAGE	MPG.	24TH MONTHS CUMULATIVE MILEAGE	MPG.	36 MONTHS CUMULATIVE MILEAGE	MPG.
1.	BLMC, 74 OFFROAD.	43	100045	10.6	35194	12.4	69122	10.6	93028	9.0
2.	FIAT, 68 OFFROAD.	47	129626	10.1	44228	10.0	83637	9.9	113451	8.0
3.	FIAT, 67 OFFROAD.	53	121325	10.1	37076	11.9	69826	10.2	97324	8.4
4.	BEDFORD, 73 OFFROAD.	44	96639	10.2	35283	12.0	65586	10.9	87159	8.6
5.	BLMC, 73 OFFROAD.	53	94817	11.5	24717	12.9	50045	11.9	70776	10.2
6.	BEDFORD, 74 OFFROAD.	48	114161	12.2	33123	13.0	60755	12.0	89133	12.0
7.	FIAT, 67 OFFROAD.	70	165593	11.5	44243	14.6	78645	13.3	108835	12.0
8.	MOGURT, 75 OFFROAD.	51	145636	11.1	66906	12.0	115013	11.0	113831	8.4
9.	BEDFORD, 72 OFFROAD.	60	163980	11.2	46383	14.5	84091	11.6	114617	11.0
10.	FIAT, 68 OFFROAD	119	237276	10.3	49968	12.0	98733	12.0	133059	12.0
11.	BEDFORD, 69 OFFROAD	84	135426	12.0	28041	12.0	47287	12.0	66235	12.4

SOURCE: BUS MAKE STUDY.

LUBRICATING OIL CONSUMED OF BUSES IN PUBLIC SECTOR

S. NO.	MODEL/STATUS	MONTHS ON ROAD	CUMULATIVE MILEAGE	AV. MILES PER GAL OF LUB. OIL	12TH MONTHS MILEAGE	MILE/PER GAL.	24TH MONTHS MILEAGE	MILES/PER GAL.	36TH MONTHS MILEAGE	MILES/PER GAL.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.	BLMC, 74 OFFROAD.	43	100045	254	35194	262	69122	257	93028	253
2.	FOAT, 68 OFFROAD.	47	129626	315	44228	339	83637	340	113451	281
3.	FIAT, 67 OFFROAD.	52	121323	363	37076	298	69826	270	97324	213
4.	BEDFORD, 74 OFFROAD.	44	95639	268	2173	255	3018	292	2214	215
5.	BLMC, 73 OFFROAD.	53	94817	113	24717	127	50045	112	70776	101
6.	BEDFORD, 74 OFFROAD.	48	114161	109	33123	107	60755	103	89133	112
7.	MOGURT, 75 OFFROAD.	51	145636	320	66906	344	115013	172	113831	213
8.	BEDFORD, 72 OFFROAD.	60	163980	139	49362	172	87134	142	118725	136
9.	FIAT, 68 OFFROAD.	119	237276	884	49968	632	98733	643	133059	599
10.	BEDFORD, 69 OFFROAD.	84	135426	174	28041	457	47287	1205	66235	622

SOURCE: BUS MAKE STUDY.

EXPENDITURE ON TYRES OF BUSES IN PUBLIC SECTOR

ANNEXURE-XXIV

S. NO.	MODEL/STATUS.	MONTHS ON ROAD	CUMULATIVE MILEAGE.	AVG. PER MONTH (RS.)	12 MONTHS MILES.	RUPEES	24 MONTHS MILES.	RUPEES	36 MONTHS MILES	RUPEES
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.	BLMC, 74 OFFROAD.	43	100045	387	35194	3618	69122	7140	93028	16651
2.	FIAT, 68 OFFROAD.	47	129626	237	44228	-	83637	4785	113451	11155
3.	FIAT, 67 OFFROAD.	53	121323	259	37076	980	69826	5515	97324	9052
4.	BEDFORD, 73 OFFROAD.	44	95639	290	3018	2722	2214	8041	87159	205
5.	BLMC, 73 OFFROAD.	53	94817	399	24717	1432	50045	7057	70776	12775
6.	BEDFORD, 74 OFFROAD.	48	114161	391	33123	-	60755	7968	89133	7968
7.	FIAT, 67 OFFROAD.	70	165593	325	44243	2357	78645	6908	108835	11234
8.	MOGURT, 75 OFFROAD.	51	145636	352	66906	1330	115013	8050	118831	17503
9.	BEDFORD, 72 OFFROAD.	60	163980	426	46383	3443	84691	7854	114617	12445
10.	FIAT, 68 OFFROAD.	119	237276	109	53376	1355	98733	4548	133059	5780
11.	BEDFORD, 69 OFFROAD.	84	135426	98	28041	823	47287	2604	66235	3243

SOURCE: BUS MAKE STUDY.

EXPENDITURE ON BATTERY OF BUSES IN PUBLIC SECTOR

ANNEXURE-XXV

S. NO.	MODEL/STATUS	MONTHS ON ROAD	CUMULATIVE MILEAGE	AVG. PER MONTH (RS.)	12 MONTHS MILEAGE	RUPEES	24 MONTHS MILEAGE	RUPEES	36 MONTHS MILEAGE	RUPEES
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.	BLMC, 74 OFFROAD.	43	100045	89	35195	525	69122	1125	93028	2432
2.	FIAT, 68 OFFROAD.	47	129626	63	44228	-	83637	734	113451	1469
3.	FIAT, 67 OFFROAD.	53	121323	48	37076	169	69826	869	97324	1197
4.	BEDFORD, 73 OFFROAD.	44	95639	78	35283	679	65586	1925	87159	2537
5.	BLMC, 73 OFFROAD.	53	94817	75	24717	380	50045	1594	70776	2816
6.	BEDFORD, 74 OFFROAD.	48	114161	101	33123	1496	60755	3096	89133	3096
7.	FIAT, 67 OFFROAD.	70	165593	53	44243	352	78645	897	108835	1687
8.	MOGURT, 75 OFFROAD.	51	145636	106	66906	-	115013	2550	113831	4209
9.	BEDFORD, 72 OFFROAD.	60	163980	133	46383	851	84691	2066	114617	4448
10.	FIAT, 68 OFFROAD.	119	237276	23	49968	-	98733	107	133059	107
11.	BEDFORD, 69 OFFROAD.	84	135426	28	28041	131	47287	438	66235	941

SOURCE: BUS MAKE STUDY.

PERFORMANCE OF SAME MODEL BUSES IN "OFF ROAD" AND IN "ON ROAD" CONDITION

ANNEXURE-XXVI

S. NO.	MODEL/AGENCY	MONTHS ON ROAD	CUMULATIVE MILEAGE	AVERAGE MONTHLY MILEAGE	AVERAGE MPG.	MILES TO A GAL OF LUB. OIL	AVERAGE MONTHLY BATTERY EXPENDITURE (RS.)	AVERAGE MONTHLY TYRE EXPENDITURE ON TYRES (RS.)	AVERAGE MAINTENANCE EXPENDITURE (RS.)	AVERAGE MONTHLY REVENUE EARNED, PAISAS PER MILE.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.	BLMC/74, ON ROAD/PRTB	40	100373	2509	10.6	264	110	327	1066	45
2.	BLMC/74, OFFROAD/FRTB	43	100045	2326	10.6	254	89	387	1236	148
3.	BLMC/73, ON ROAD/PUTS.	49	116251	1927	11.3	385	67	395	952	50
4.	BLMC/73, OFFROAD/PLTC.	53	94817	1789	11.5	113	75	399	998	54
5.	BF/74, ON ROAD/PUTC.	48	119280	2485	11.0	109	66	363	1160	98
6.	BF/74, OFFROAD/PUTC.	48	114161	2378	12.2	109	101	391	742	219
7.	MOGURT/75, ONROAD/KTC.	53	105555	2935	12.5	176	106	523	1183	12
8.	MOGURT/75, OFFROAD/KTC.	51	145636	4792	11.1	320	106	352	887	113

SOURCE: BUS MAKE STUDY.

PERFORMANCE OF SAME MODEL BUSES IN VARIOUS AGENCIES

ANNEXURE-XXVII

S. NO.	MODEL/AGENCY	MONTHS ON ROAD	CUMULATIVE MILEAGE	AVERAGE MONTHLY MILEAGE	AVERAGE MPG.	MILES TO GAL OF LUB. OIL	AVERAGE MONTHLY BATTERY EXPENDITURE (RS.)	AVERAGE MONTHLY EXPENDITURE ON TYRES (RS.)	AVERAGE MONTHLY MAINTENANCE EXPENDITURE (RS.)	AVERAGE MONTHLY REVENUE EARNED, PAI SAS PER MILE
9.	FIAT, 68/PRTB.	47	129626	2758	10.1	315	63	237	936	75
10.	FIAT, 69/NWFP. GTC.	119	237276	1993	10.3	884	23	109	225	19
11.	FIAT, 67/SRTC.	70	165593	2265	11.5	128	53	325	1332	27
12.	FIAT, 67/PRTT.	53	121323	2289	10.1	363	48	259	847	24
13.	ISUZU, 75/PRTB.	47	129672	4109	10.0	448	112	429	1689	44
14.	ISUZU, 75/PUTC.	46	119294	3666	12.1	141	78	570	978	38
15.	BF, 74/PUTC.	48	119280	2485	11.0	109	66	363	1160	98
16.	BF, 74/SRTC.	54	147883	2738	13.6	134	110	585	1235	165
17.	BF, 74/KTC.	60	154361	2948	11.2	138	119	628	1076	22
18.	BF, 74/NWFP. GTS.	50	143644	3057	12.0	306	66	82	619	37
19.	MGURT, 75/SRTC.	53	133772	2524	15.0	133	115	561	1074	121
20.	MGURT, 75/KTC.	53	105555	2935	12.5	175	106	523	1183	12

SOURCE: BUS MAKE STUDY.

PERFORMANCE OF VARIOUS MODEL BUSES IN THE SAME AGENCIES

S. No.	MAKE/MODEL/STATUS	MONTHS ON ROAD	CUMULATIVE MILEAGE.	AVERAGE MONTHLY MILEAGE.	AVERAGE M.P.G.	MILES TO A GAL OF LUB.OIL	AV. MONTHLY BATTERY EXPENDITURE (RS)	PER PS/MILE	AV. MONTHLY EXPENDITURE TYRES. (RS)	PER PS/MILE	AV. MONTHLY MAINTENANCE EXPENDITURE.	PER PS/MILE	TOTAL 8+9	AV. MONTHLY EARNED, PAISAS PER MILE
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1.	BLMC, 74 ON ROAD.	40	100373	2509	10.6	204	110	4.38	327	13.03	1066	42.49	1503	45
2.	BLMC, 74 OFFROAD.	43	100045	2326	10.6	254	89	3.83	387	16.64	1234	53.14	1712	148
3.	FIAT, 68 OFFROAD.	47	129626	2758	10.1	315	63	2.28	237	8.59	936	33.94	1236	75
4.	FIAT, 67 OFFROAD.	53	121323	2289	10.1	363	48	2.10	259	11.31	847	37.00	1154	24
5.	BEDFORD, 75 OFFROAD	44	95639	2173	10.2	268	78	3.59	290	13.35	1275	58.58	1643	24
6.	ISUZU, 75 ON ROAD	47	129672	4109	10.0	448	112	2.73	429	10.44	1689	41.10	2230	44

PUTB:

1.	BLMC, 73 ON ROAD.	49	116251	1927	11.3	386	67	3.48	395	20.50	952	49.40	1414	50
2.	BLMC, 73 OFFROAD.	53	94817	1789	11.5	113	75	4.19	399	22.30	998	55.78	1472	54
9.	BEDFORD, 74 ONROAD	48	119280	2485	11.0	109	66	2.66	363	14.61	1160	46.68	1589	98
10.	BEDFORD, 74 OFFROAD	48	114161	2378	12.2	109	101	4.25	391	16.44	742	31.20	1234	219
11.	ISUZU, 74 ON ROAD.	48	86624	2936	12.0	117	92	3.13	434	14.78	1027	34.98	1553	12
12.	ISUZU, 75 ON ROAD.	48	119294	3666	12.1	141	78	2.13	570	15.54	978	26.67	1626	38

PUTC:

1.	BLMC, 73 ON ROAD.	49	116251	1927	11.3	386	67	3.48	395	20.50	952	49.40	1414	50
2.	BLMC, 73 OFFROAD.	53	94817	1789	11.5	113	75	4.19	399	22.30	998	55.78	1472	54
9.	BEDFORD, 74 ONROAD	48	119280	2485	11.0	109	66	2.66	363	14.61	1160	46.68	1589	98
10.	BEDFORD, 74 OFFROAD	48	114161	2378	12.2	109	101	4.25	391	16.44	742	31.20	1234	219
11.	ISUZU, 74 ON ROAD.	48	86624	2936	12.0	117	92	3.13	434	14.78	1027	34.98	1553	12
12.	ISUZU, 75 ON ROAD.	48	119294	3666	12.1	141	78	2.13	570	15.54	978	26.67	1626	38

S. NO.:	MAKE/MODEL/STATUS	MONTH ON ROAD	CUMULATIVE MILEAGE	AVERAGE MONTHLY MILEAGE	AV. MPG.	MILES TO A GAL OF LUB. OIL.	AVERAGE MONTHLY BATTERY EXPENDITURE (RS.)	PER PS/MILE	AVERAGE EXPENDITURE ON TYRES (RS.)	PER PS/MILE	AVERAGE MONTHLY MAINTENANCE EXPENDITURE (RS.)	PER PS/MILE	TOTAL	AVERAGE MONTHLY REVENUE EARNED PS/MILE
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
<u>SRTC:</u>														
13.	MOGURTI, 75 ON ROAD.	53	118193	2212	15.1	137	108	4.88	522	23.60	792	35.80	1422	88
14.	MOGURTI, 75 ON ROAD.	53	133772	2524	15.0	133	115	4.56	561	22.22	1074	42.55	1750	121
15.	BEDFORD, 74 CN ROAD.	54	147883	2738	13.6	134	110	4.02	535	21.37	1235	45.10	1930	165
16.	FIAT, 67 OFFROAD.	70	165593	2365	11.5	128	53	2.24	325	13.74	1332	56.32	1710	27
<u>KTC:</u>														
17.	MOGURTI, 75 ON ROAD.	53	105555	2935	12.5	176	106	3.61	523	17.82	1183	40.30	1812	12
18.	MOGURTI, 75 OFFROAD.	51	145636	4792	11.1	320	106	2.21	352	7.35	887	18.51	1345	113
19.	BEUFORD, 74 CN ROAD.	60	154361	2948	11.2	138	119	4.04	628	21.30	1076	36.49	1823	22
20.	BEDFORD, 72 OFFROAD.	60	163980	2733	11.2	139	133	4.87	426	15.58	1041	38.09	1600	46
<u>NWFP(G.T.S.):</u>														
21.	FIAT, 74 ON ROAD.	52	146264	4452	11.4	407	88	1.98	110	2.47	621	13.94	819	2
22.	FIAT, 68 OFFROAD.	119	237276	1993	10.3	884	23	1.15	109	5.47	225	11.28	357	19
23.	BEDFORD, 75 ON ROAD.	60	164033	2501	12.2	1005	76	3.04	62	2.48	511	20.43	649	39
24.	BEDFORD, 74 ON ROAD.	50	143644	3057	12.0	306	66	2.16	82	2.68	619	20.24	767	37
25.	BEDFORD, 69 OFFROAD.	84	135426	1612	12.0	174	28	1.74	98	6.08	1612	100.00	1738	63

SOURCE: BUS MAKE STUDY.

INLAND TRAFFIC

ANNEXURE-XXIX

S. No.	TYPE OF MODES	1971-72	1977-78	1980-81	1982-83	1983-84	1984-85	1987-88	1999-2000
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PASSENGER KM(MILLION):

1.	Road.	36,520	65,370	65,991	79,513	84,464	89,452	106,885	182,052
2.	Rail.	9,515	13,471	16,311	16,502	17,312	18,160	21,000	48,868
3.	Air.	300	1,026	1,205	1,484	1,510	1,623	2,162	3,851

FREIGHT TON KM(MILLION):

1.	Road.	8,047	12,389	18,207	21,200	22,620	24,126	31,401	70,039
2.	Rail.	7,756	9,332	7,918	7,500	8,115	8,730	9,581	20,188
3.	Air.	5	18	16	19	22	24	26	44

SOURCE: ECONOMIC SURVEY OF PAKISTAN, JICA.

INLAND TRAFFIC
% SHARE

(FIGURE IN PERCENTAGE)

S. No.	TYPE OF MODES	1971-72	1977-78	1980-81	1982-85	1983-84	1984-85	1987-88	1999-2000
<u>PASSENGER (KM (MILLION)) :</u>									
1.	Road.	78.8	81.8	79.0	81.6	81.7	81.9	82.2	77.5
2.	Rail.	20.5	16.9	19.5	16.9	16.8	16.6	16.1	20.8
3.	Air.	0.7	1.3	1.5	1.5	1.5	1.5	1.7	1.7
TOTAL :-		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

FREIGHT TON KM (MILLION) :

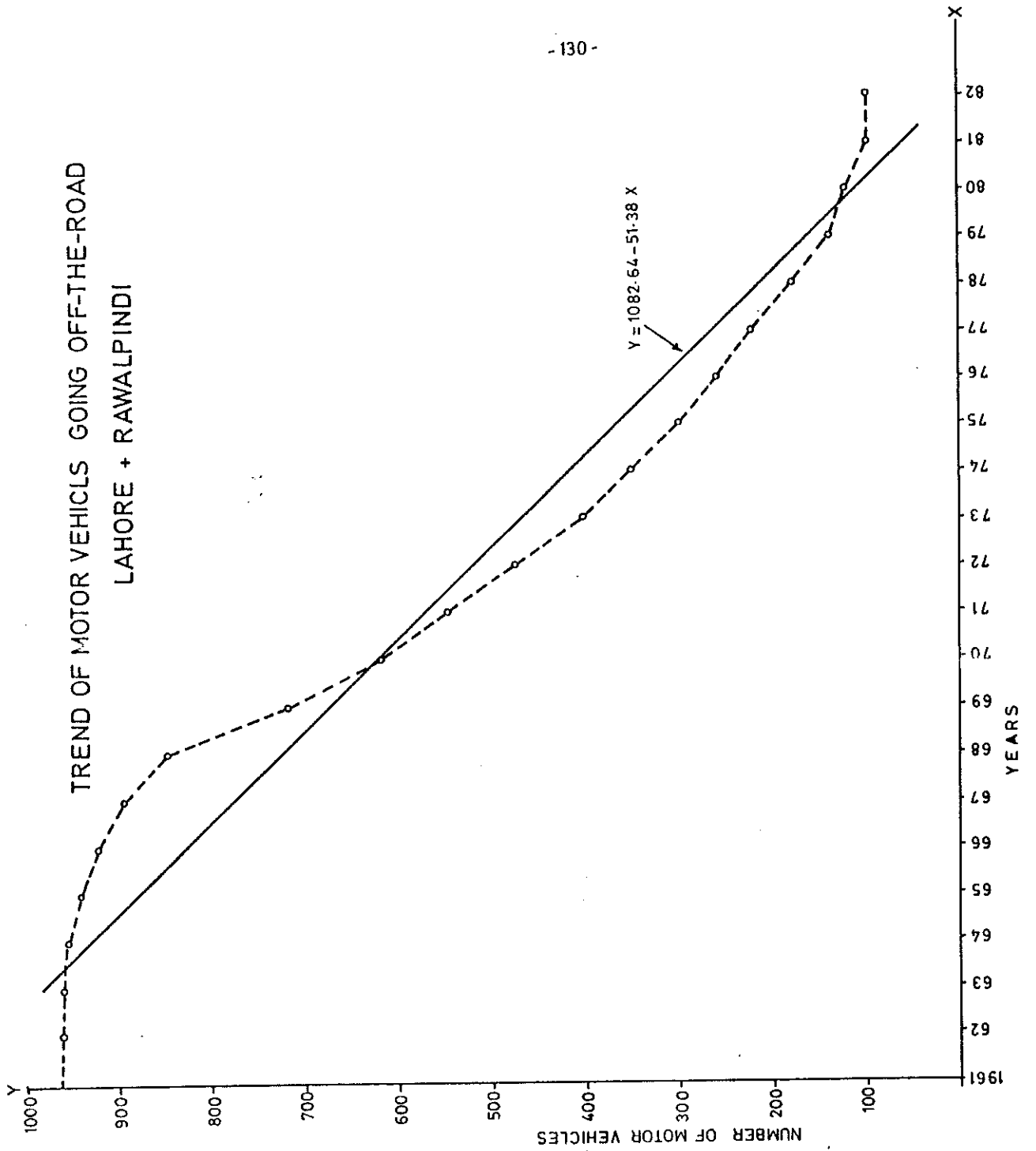
1.	Road.	50.9	57.0	69.6	73.8	73.5	73.3	76.6	77.6
2.	Rail.	49.0	42.9	30.3	26.1	26.4	26.6	23.3	22.3
3.	Air.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL :-		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

ANNEXURE-XXXI

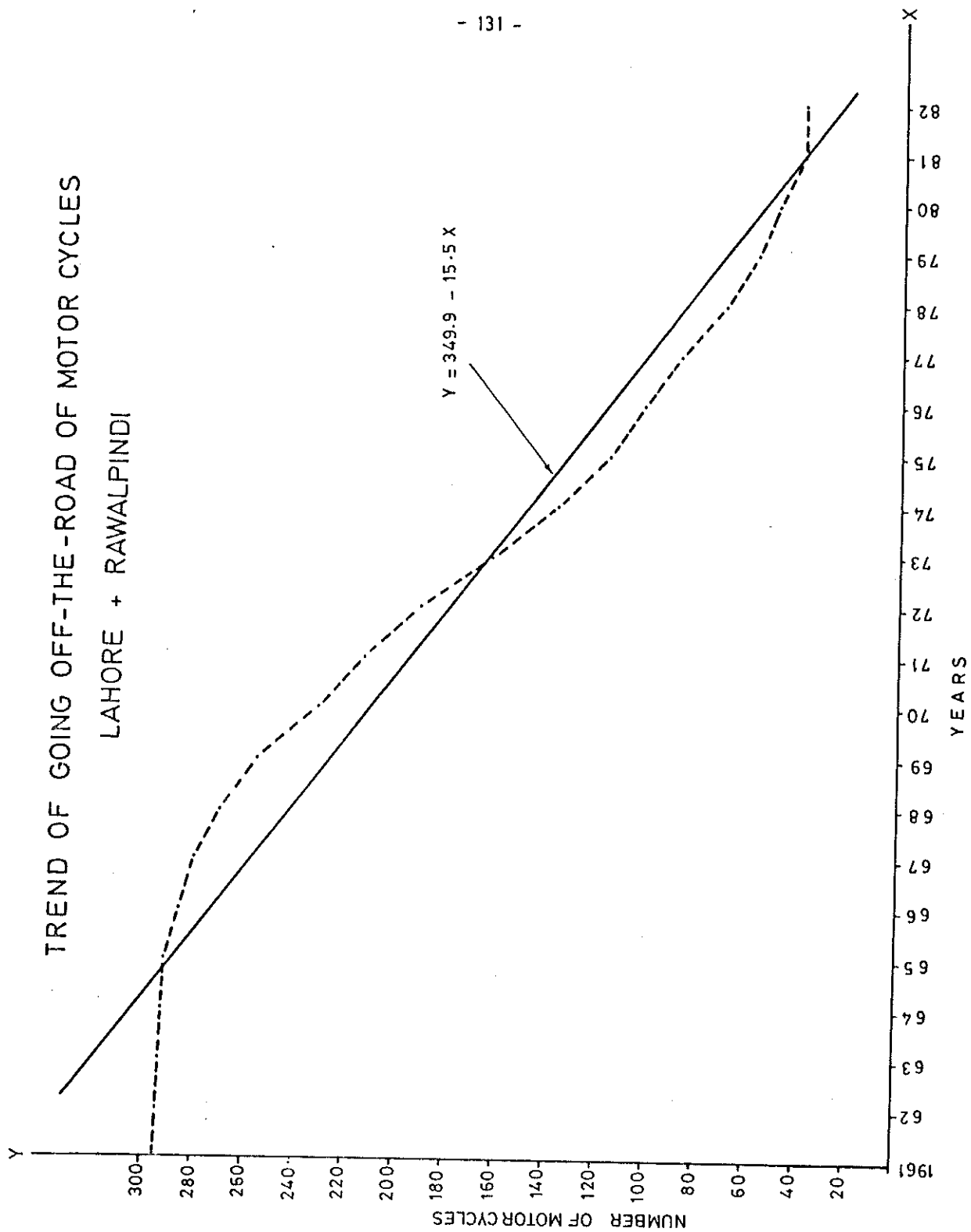
MOTOR VEHICLES ON ROAD IN PAKISTAN

S. NO.	TYPE OF VEHICLES/YEAR	1980	1983	1988	1993	1999
1.	MOTOR CYCLE/SCOOTER.	289,328	418,684	775,160	1,435,147	1,662,304
2.	MOTOR CAR/JEEP/S. WAGON.	183,694	228,463	328,599	472,624	731,032
3.	TRACTOR.	68,625	108,544	233,035	367,020	535,836
4.	BUS.	25,548	29,300	36,811	46,248	60,817
5.	MOTOR CAB TAXI.	16,819	20,364	28,005	38,514	56,451
6.	MOTOR RICKSHAW.	32,226	36,521	44,992	55,427	71,191
7.	DELIVERY VAN.	8,300	13,134	28,222	44,489	62,150
8.	PUBLIC/PRIVATE CARRIER TRUCK.	36,341	44,539	62,527	87,779	131,880
9.	OTHERS.	28,882	51,691	136,360	291,500	511,081
TOTAL:		689,763	951,240	1,673,711	2,838,748	3,822,742

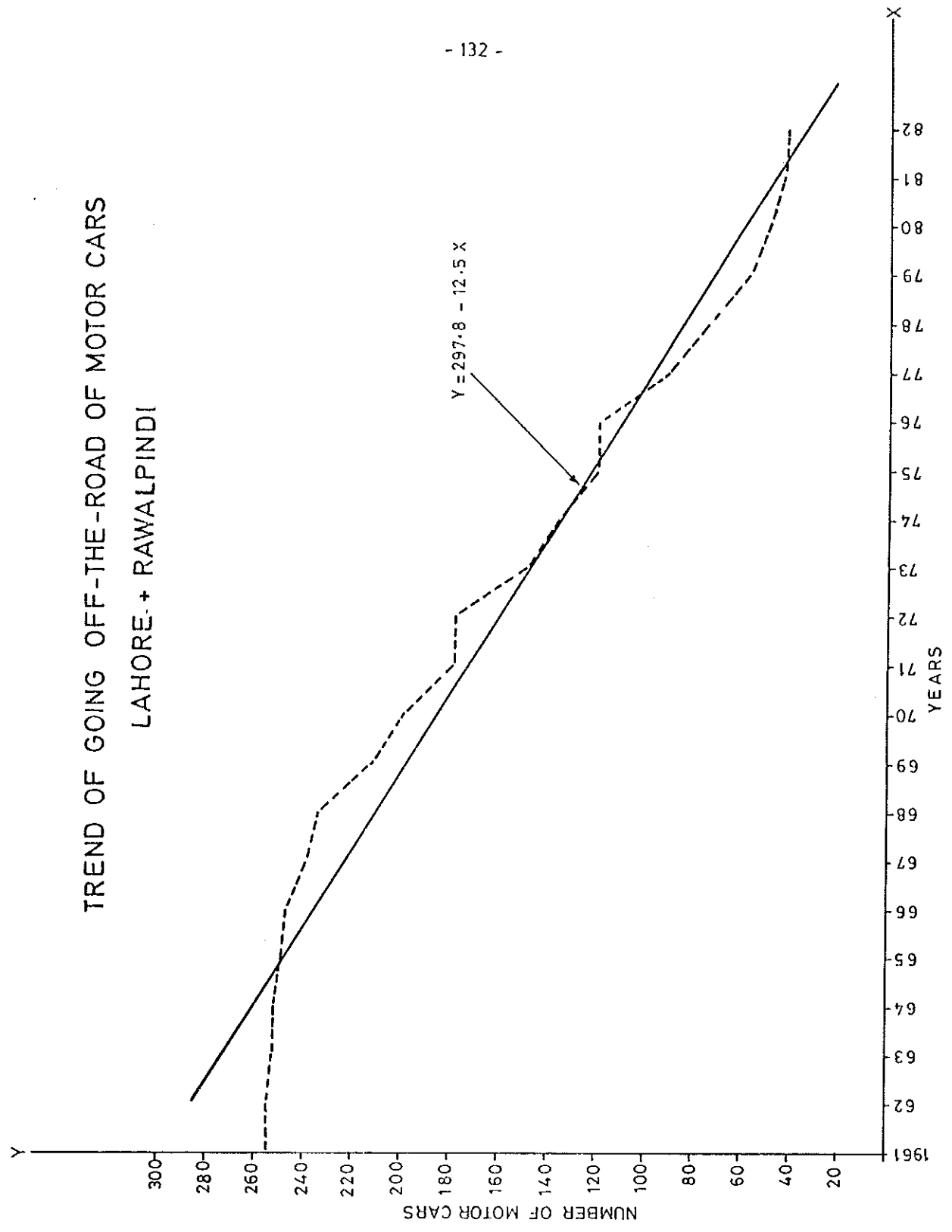
NB: PROJECTION BASED ON AAGR.

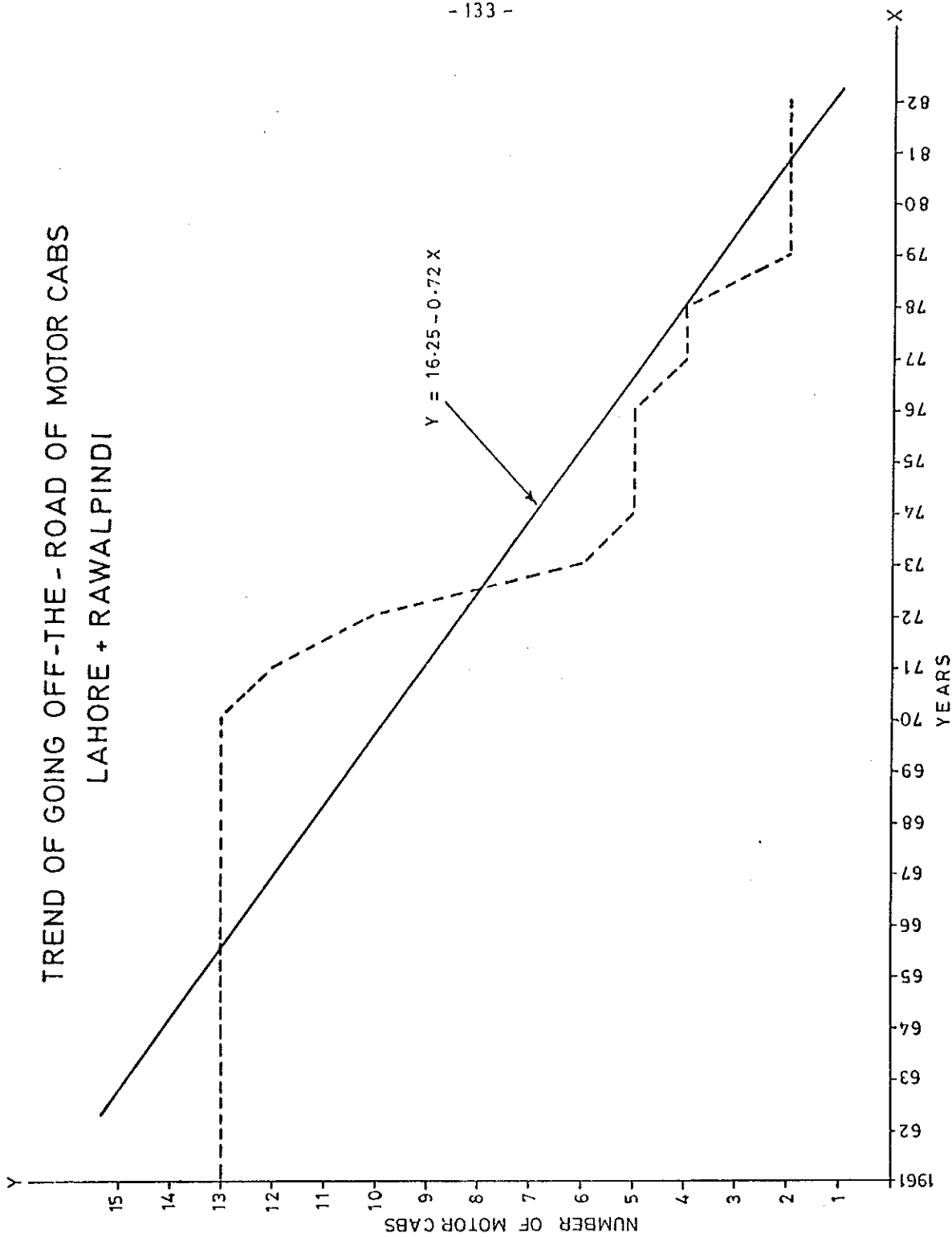


TREND OF GOING OFF-THE-ROAD OF MOTOR CYCLES
LAHORE + RAWALPINDI

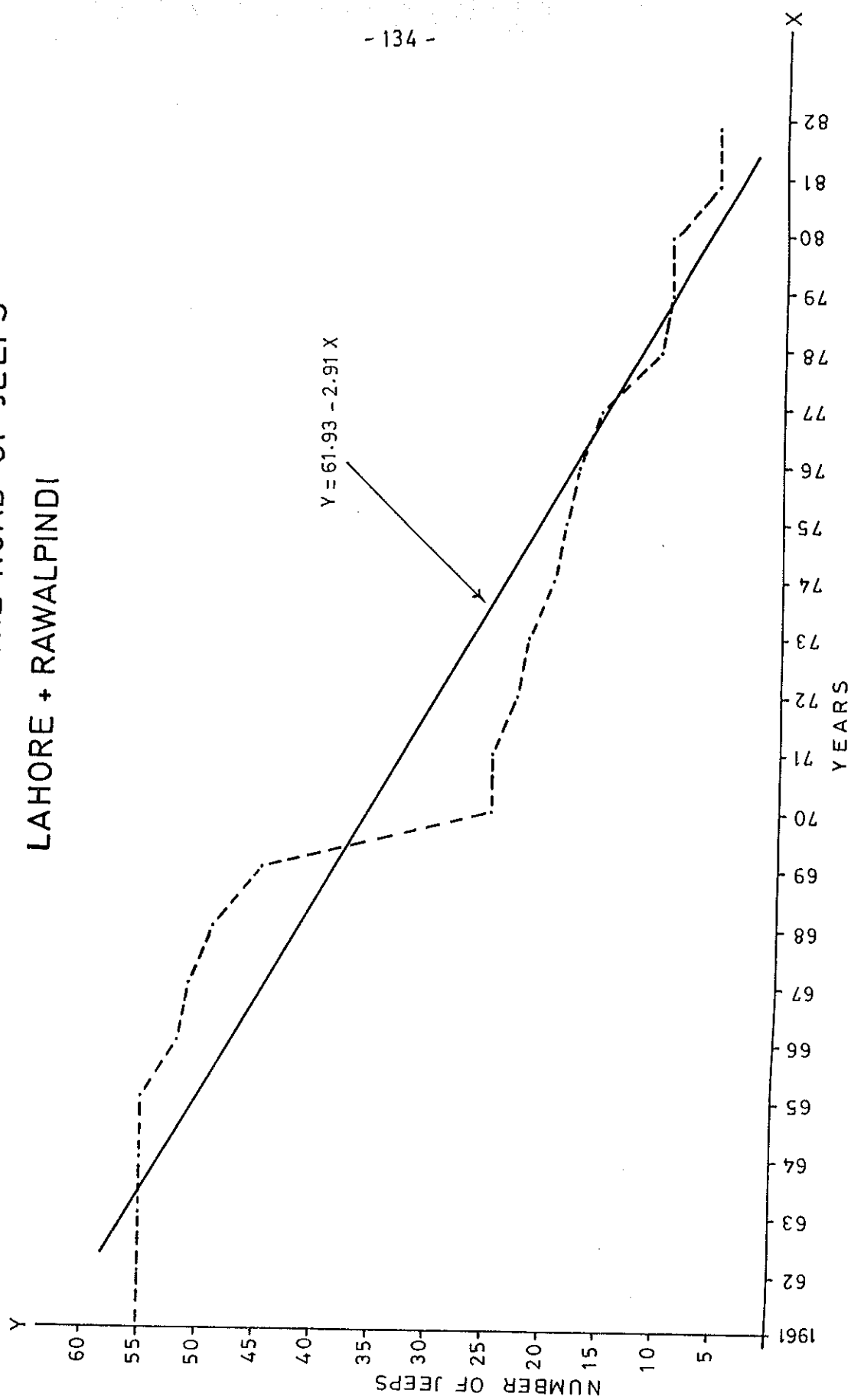


TREND OF GOING OFF-THE-ROAD OF MOTOR CARS LAHORE + RAWALPINDI

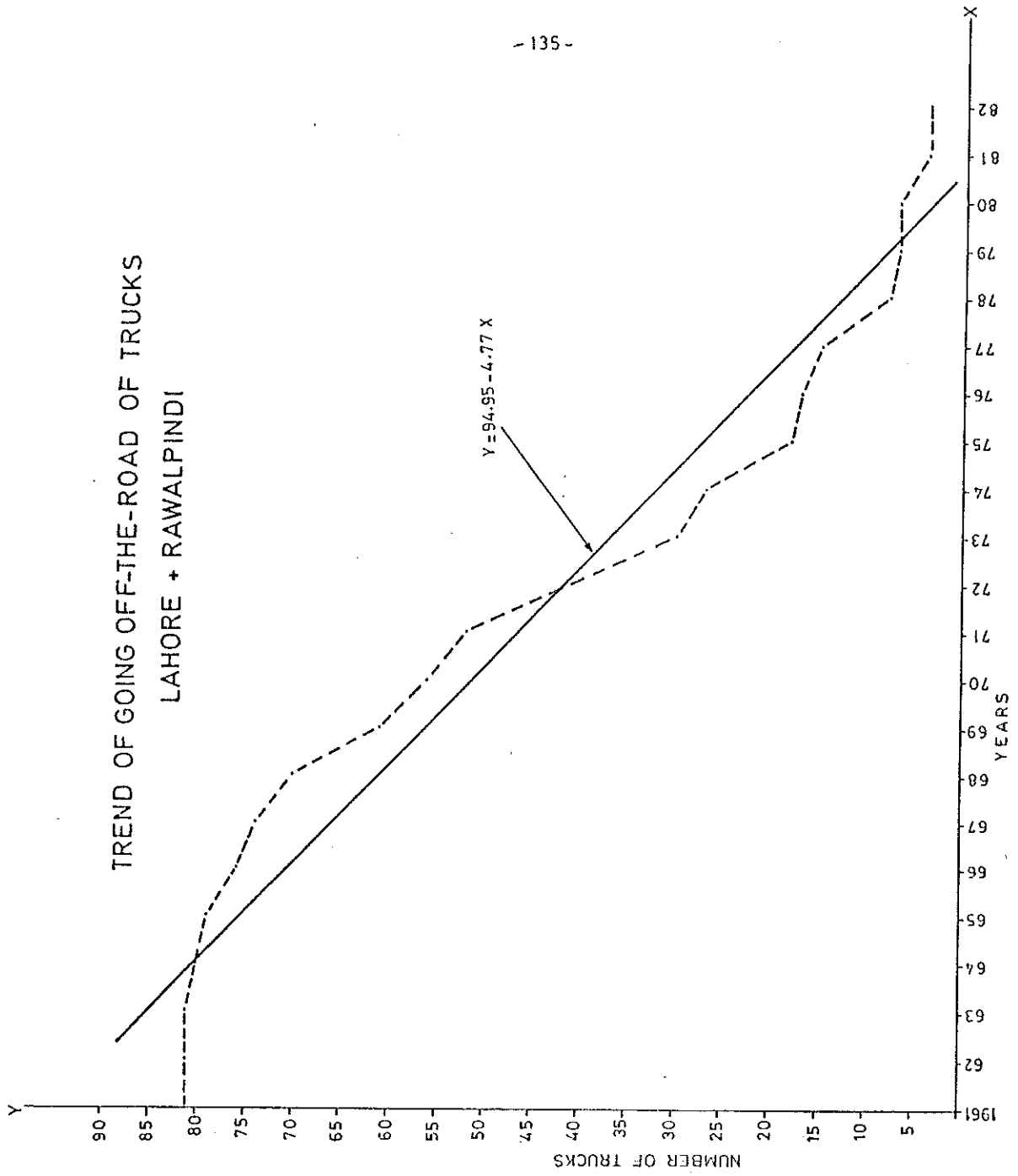




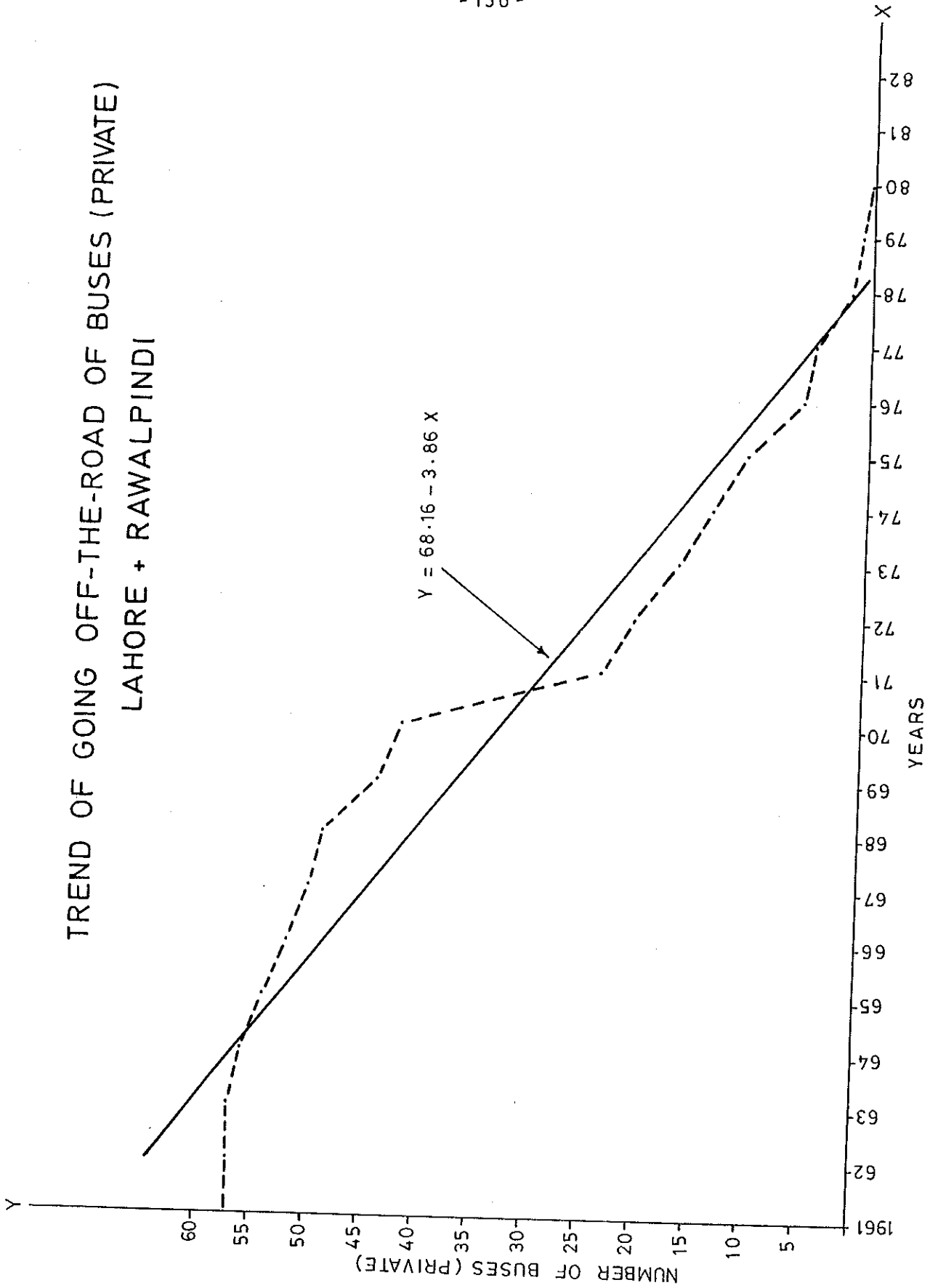
TREND OF GOING OFF-THE-ROAD OF JEEPS LAHORE + RAWALPINDI



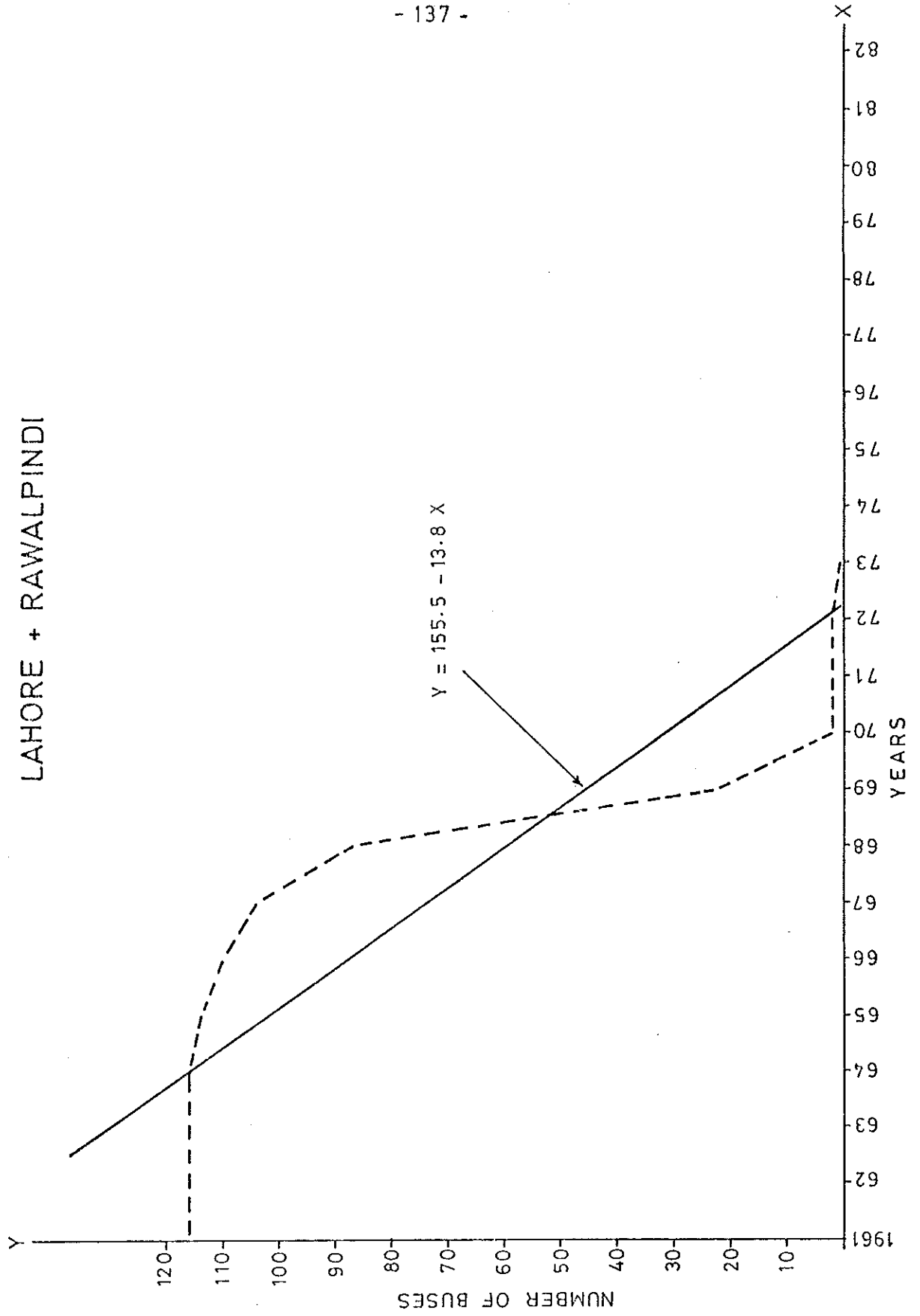
TREND OF GOING OFF-THE-ROAD OF TRUCKS LAHORE + RAWALPINDI



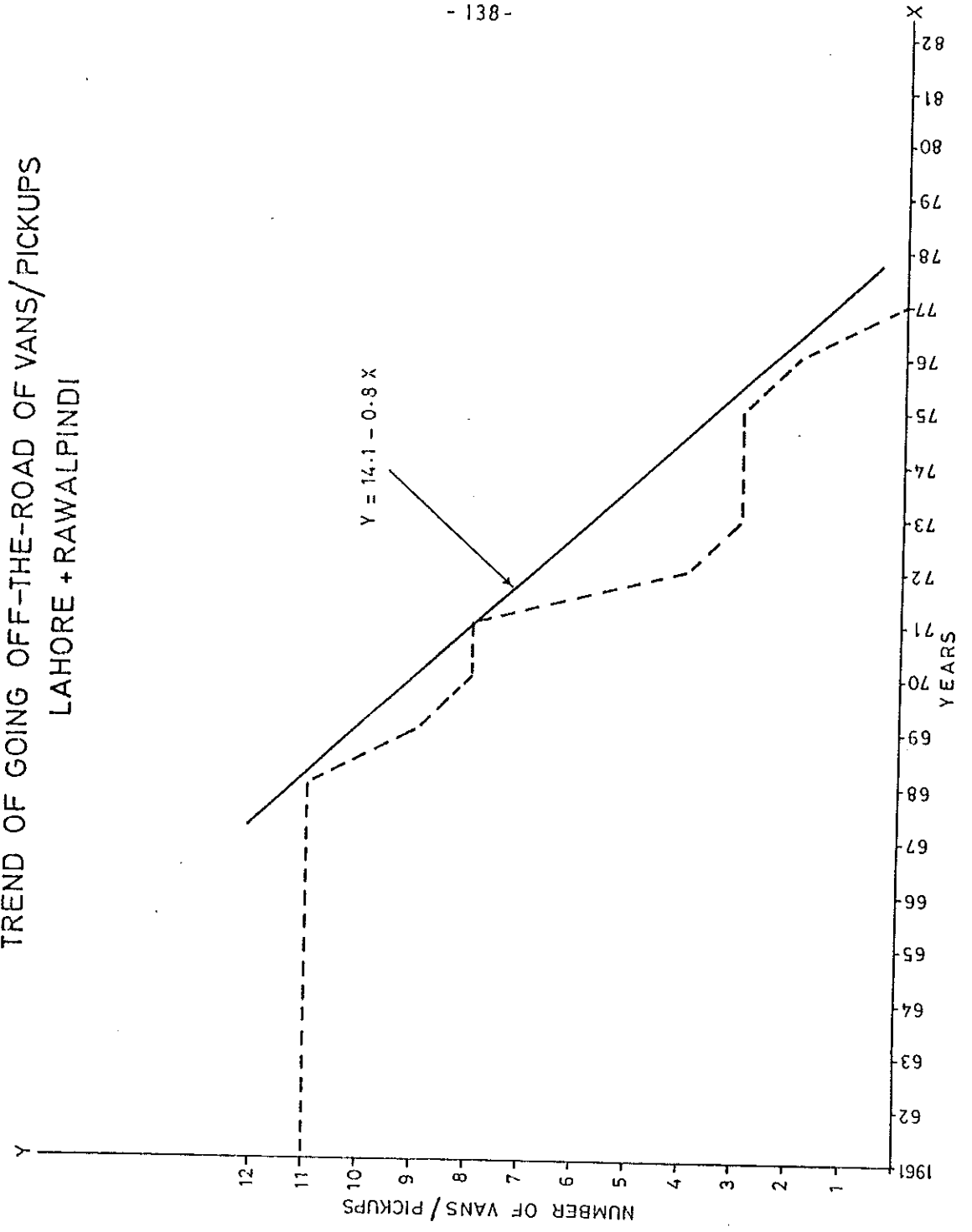
TREND OF GOING OFF-THE-ROAD OF BUSES (PRIVATE) LAHORE + RAWALPINDI



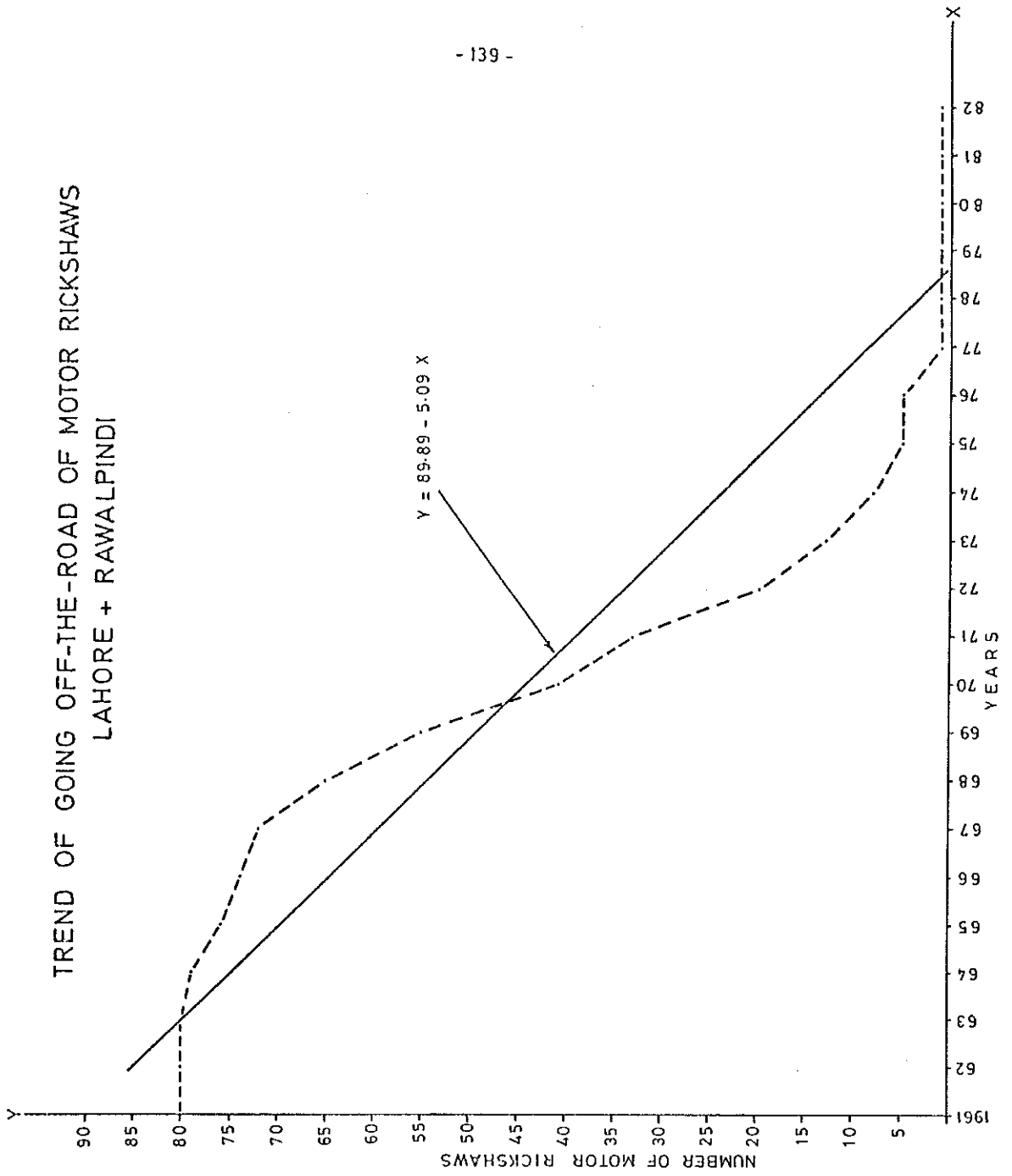
TREND OF GOING OFF-THE-ROAD OF BUSES (GTS) LAHORE + RAWALPINDI



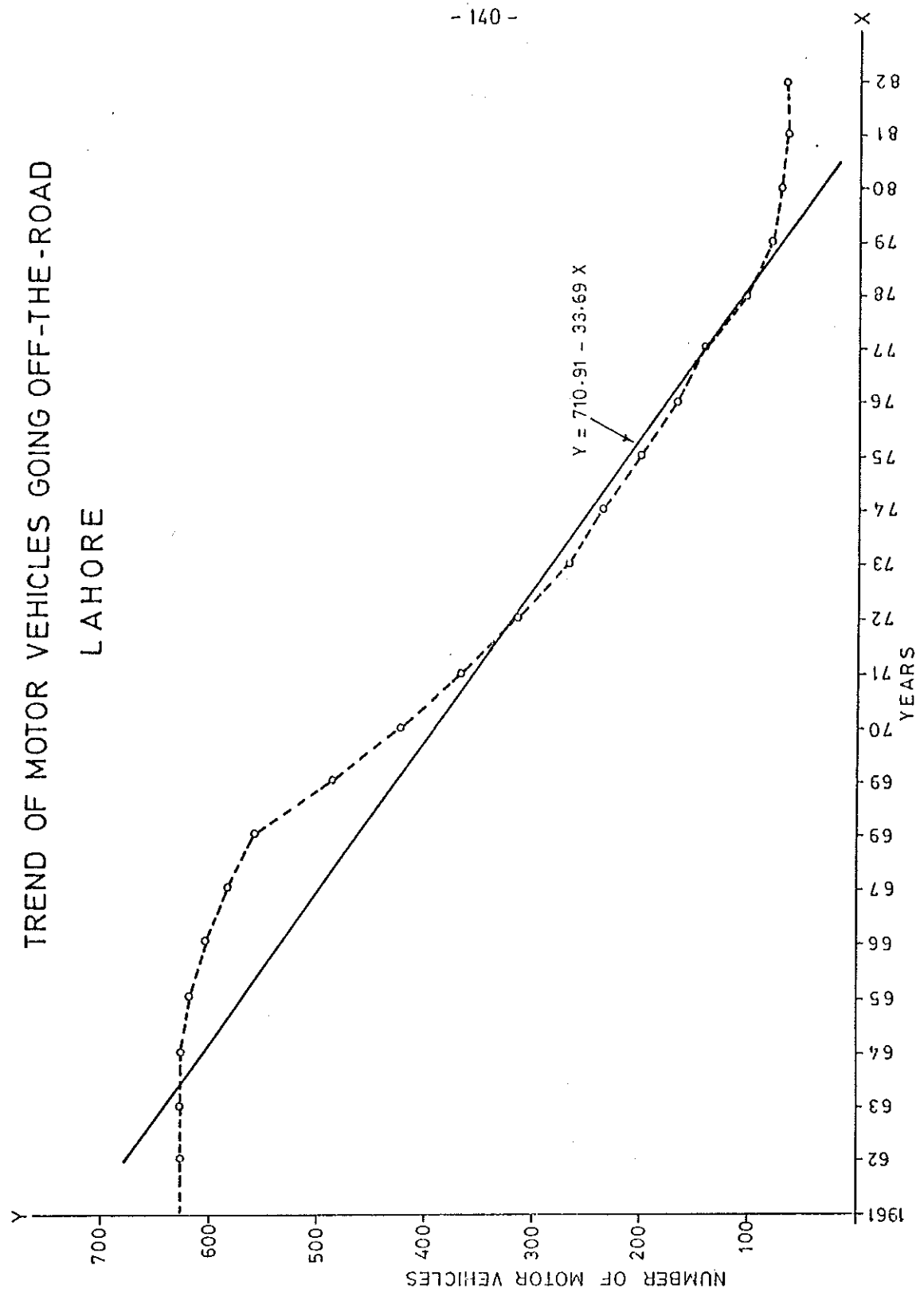
TREND OF GOING OFF-THE-ROAD OF VANS/PICKUPS LAHORE + RAWALPINDI



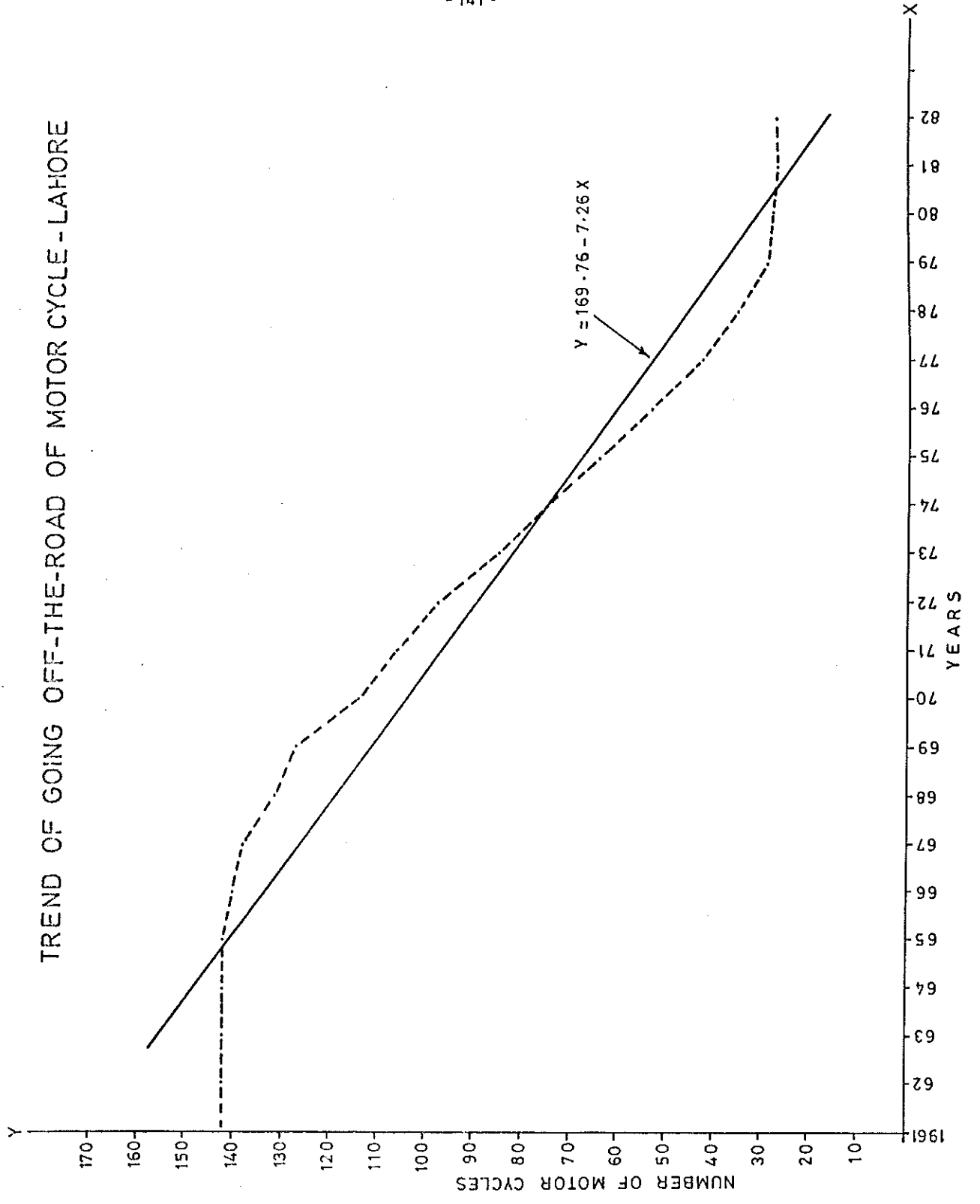
TREND OF GOING OFF-THE-ROAD OF MOTOR RICKSHAWS
LAHORE + RAWALPINDI



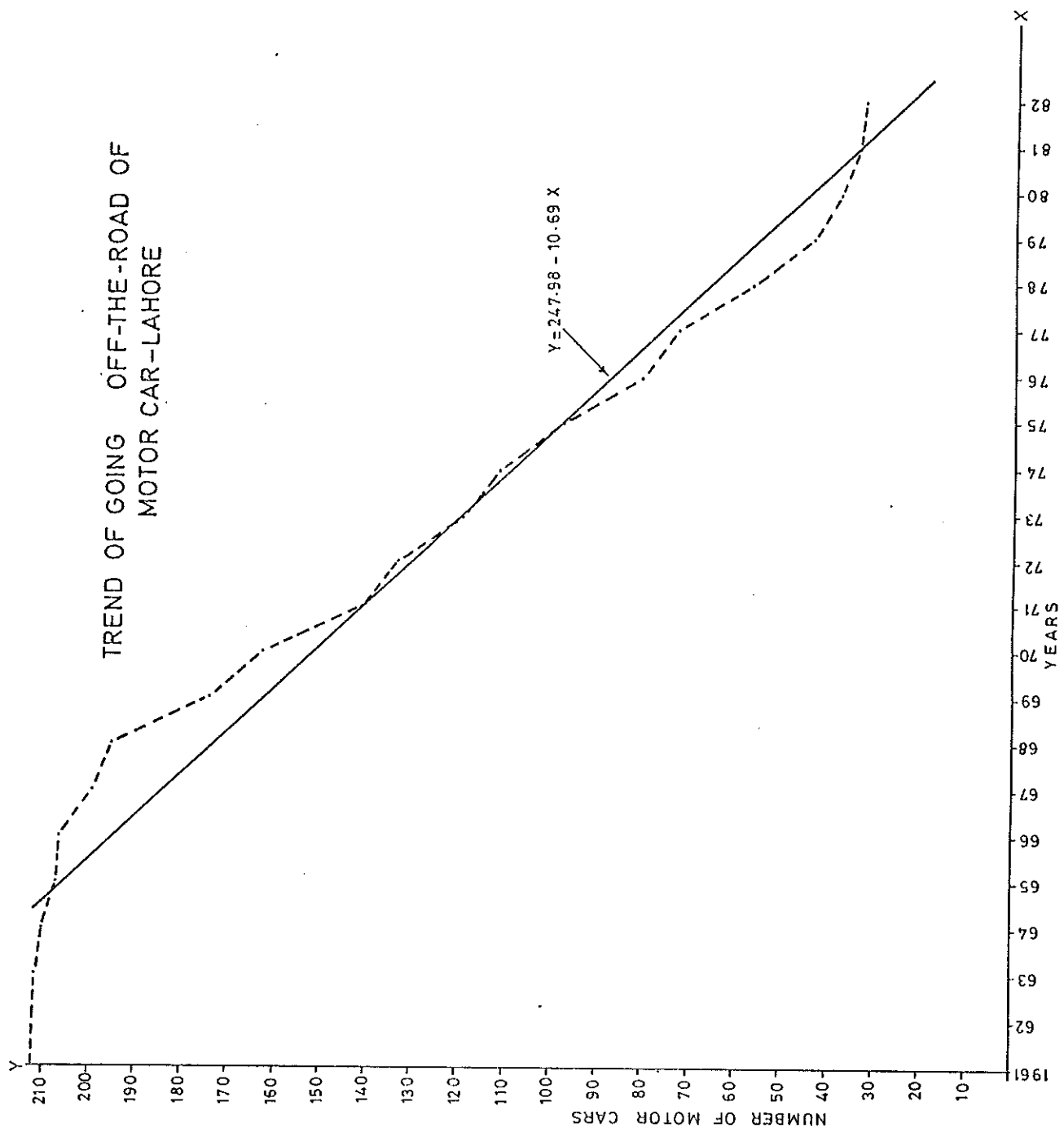
TREND OF MOTOR VEHICLES GOING OFF-THE-ROAD LAHORE



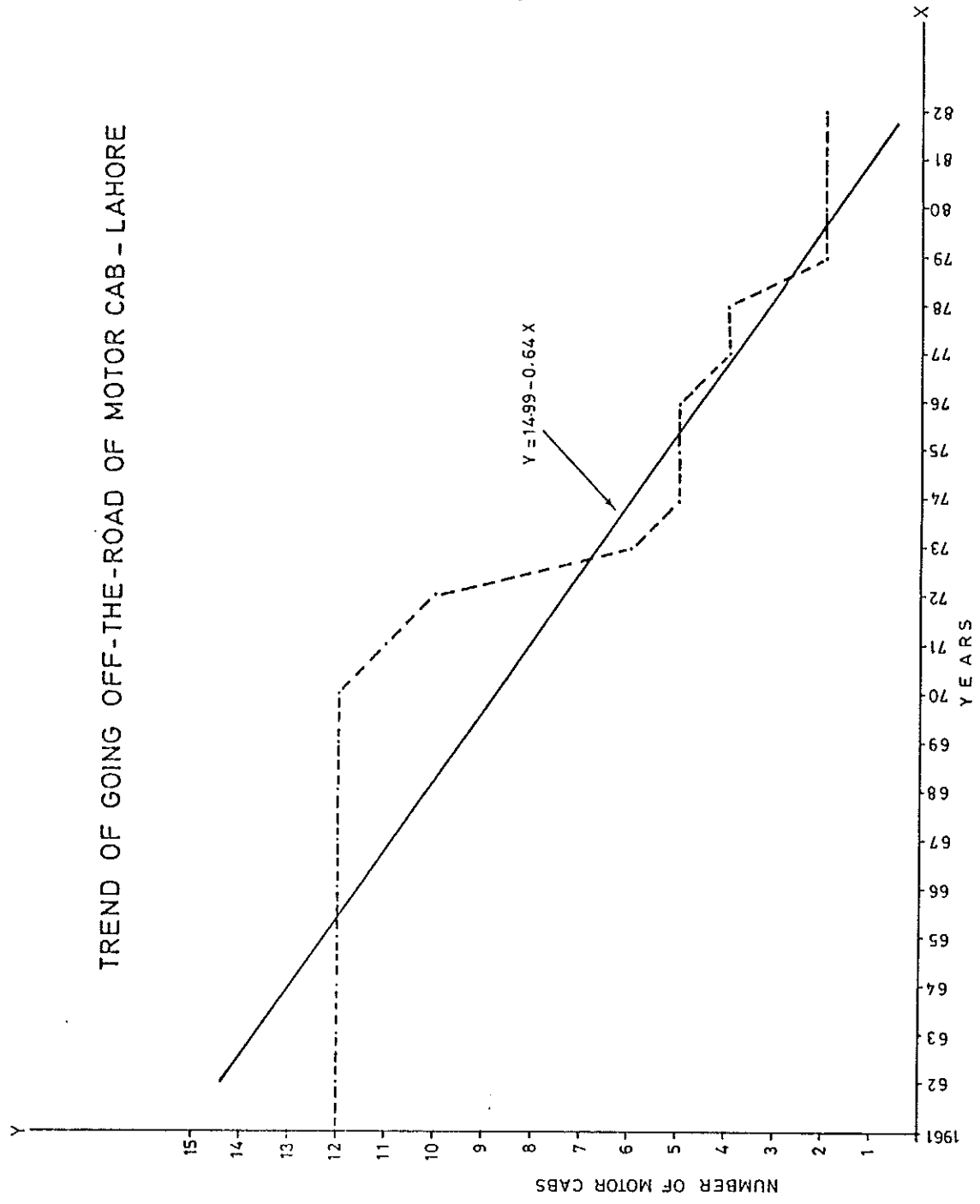
TREND OF GOING OFF-THE-ROAD OF MOTOR CYCLE - LAHORE



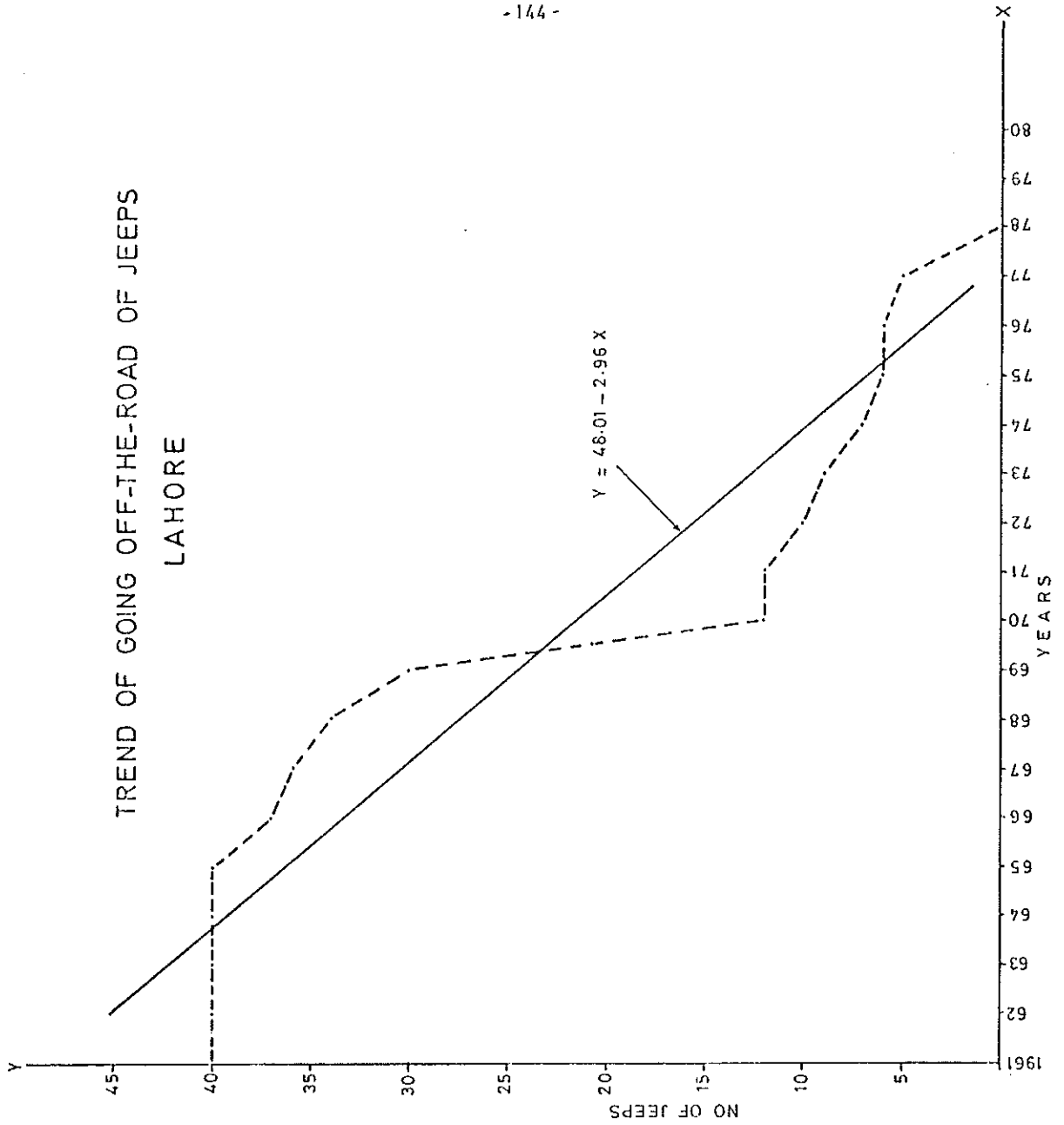
TREND OF GOING OFF-THE-ROAD OF MOTOR CAR - LAHORE

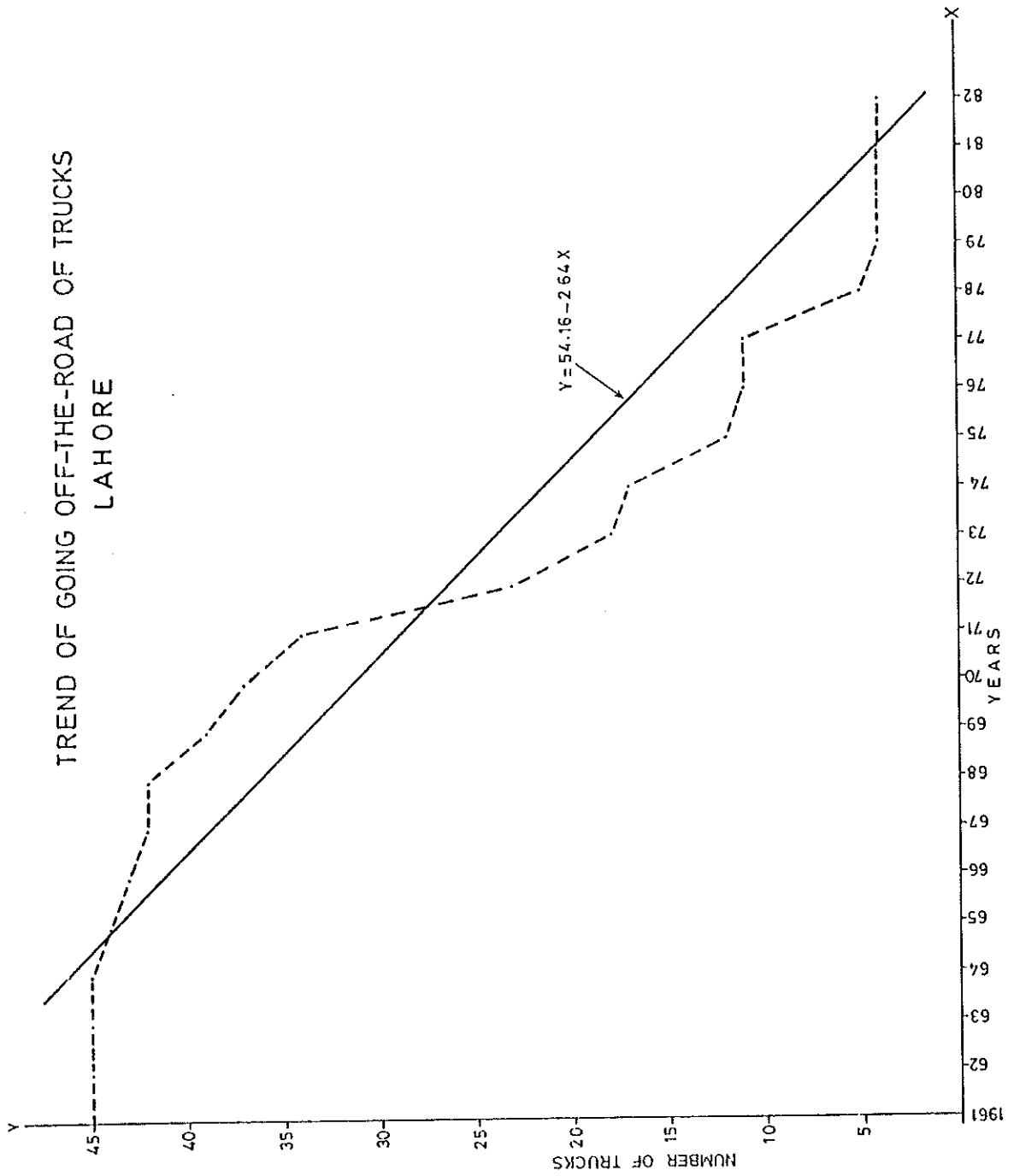


TREND OF GOING OFF-THE-ROAD OF MOTOR CAB - LAHORE

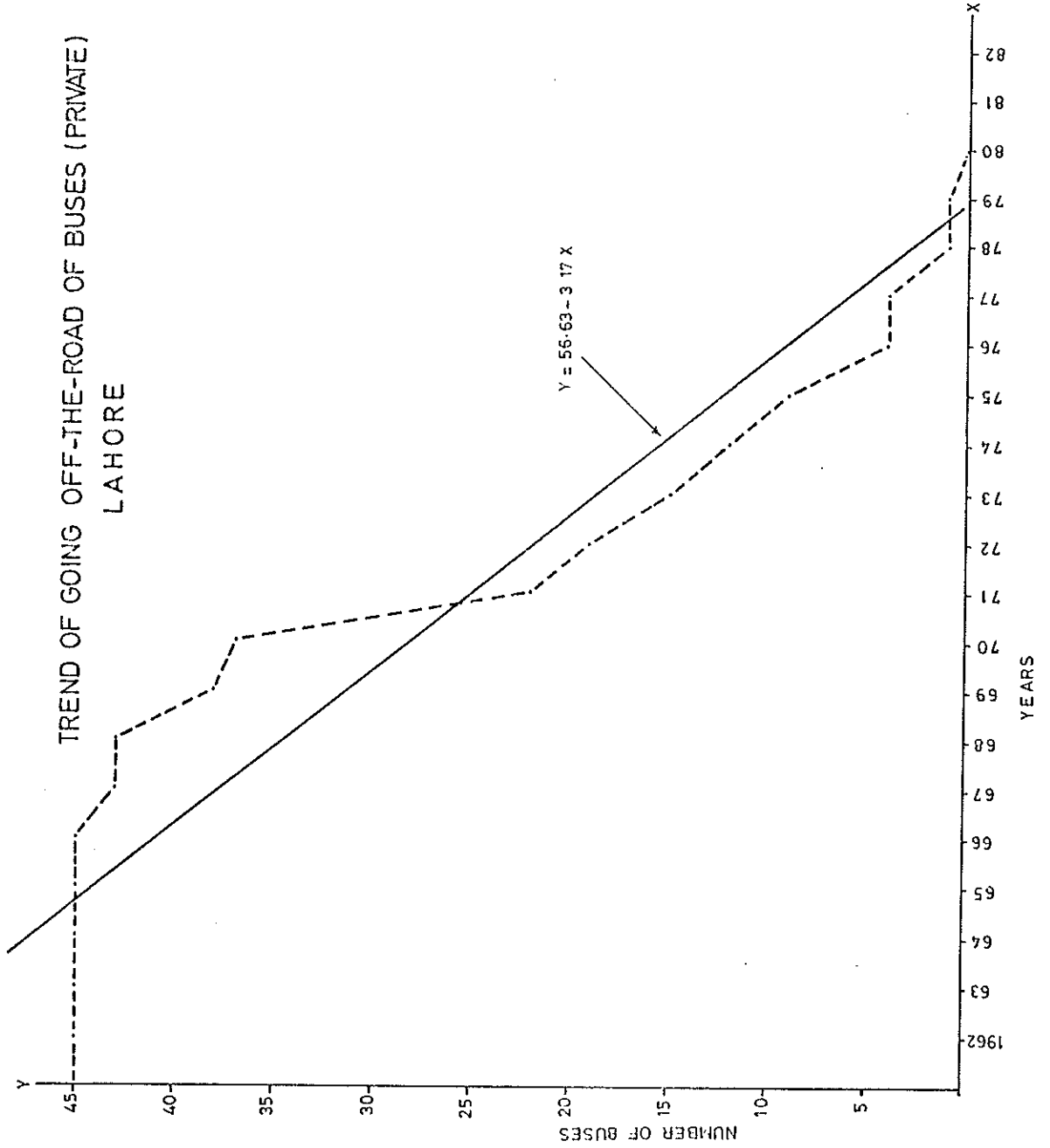


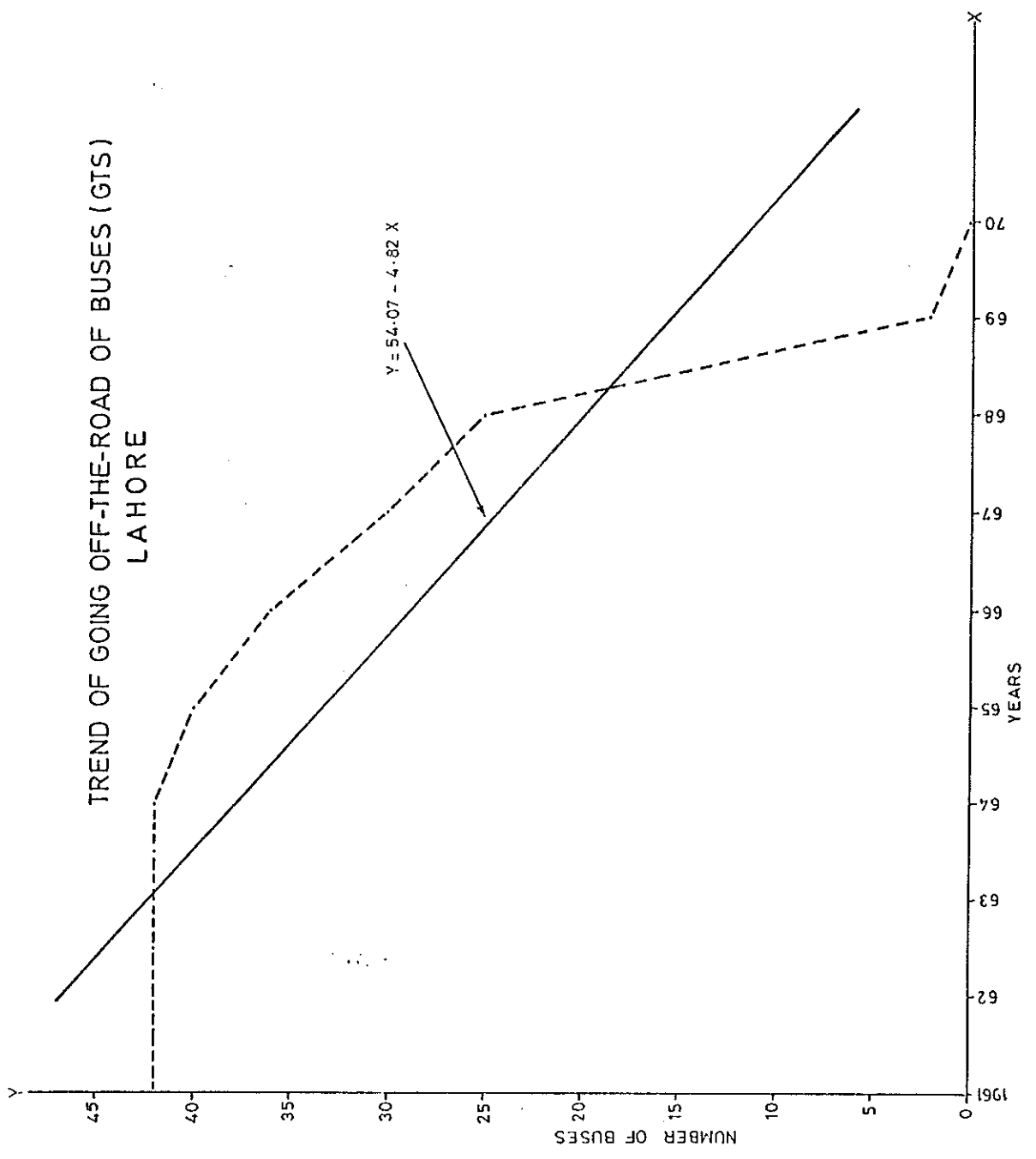
TREND OF GOING OFF-THE-ROAD OF JEEPS LAHORE



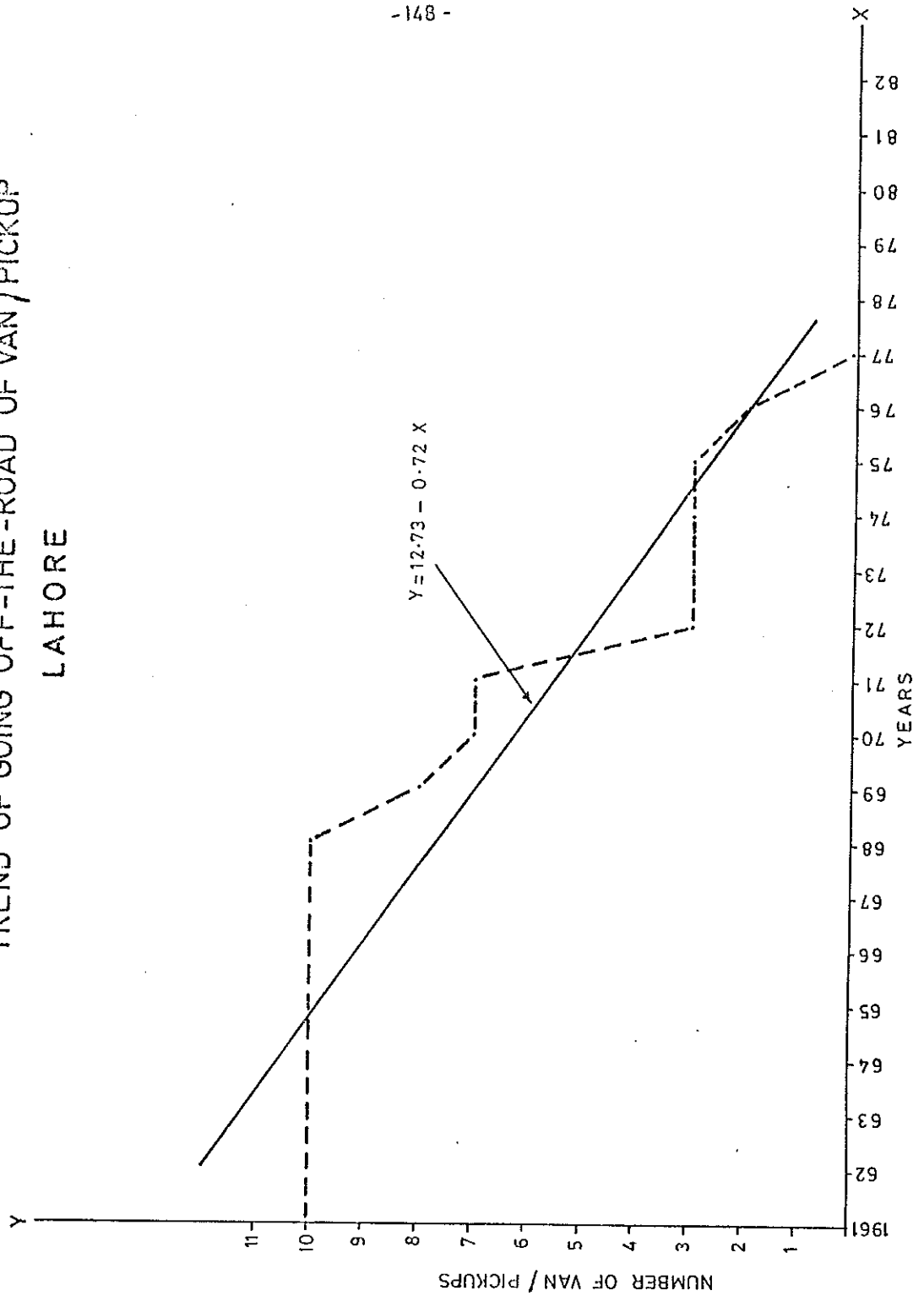


TREND OF GOING OFF-THE-ROAD OF BUSES (PRIVATE) LAHORE

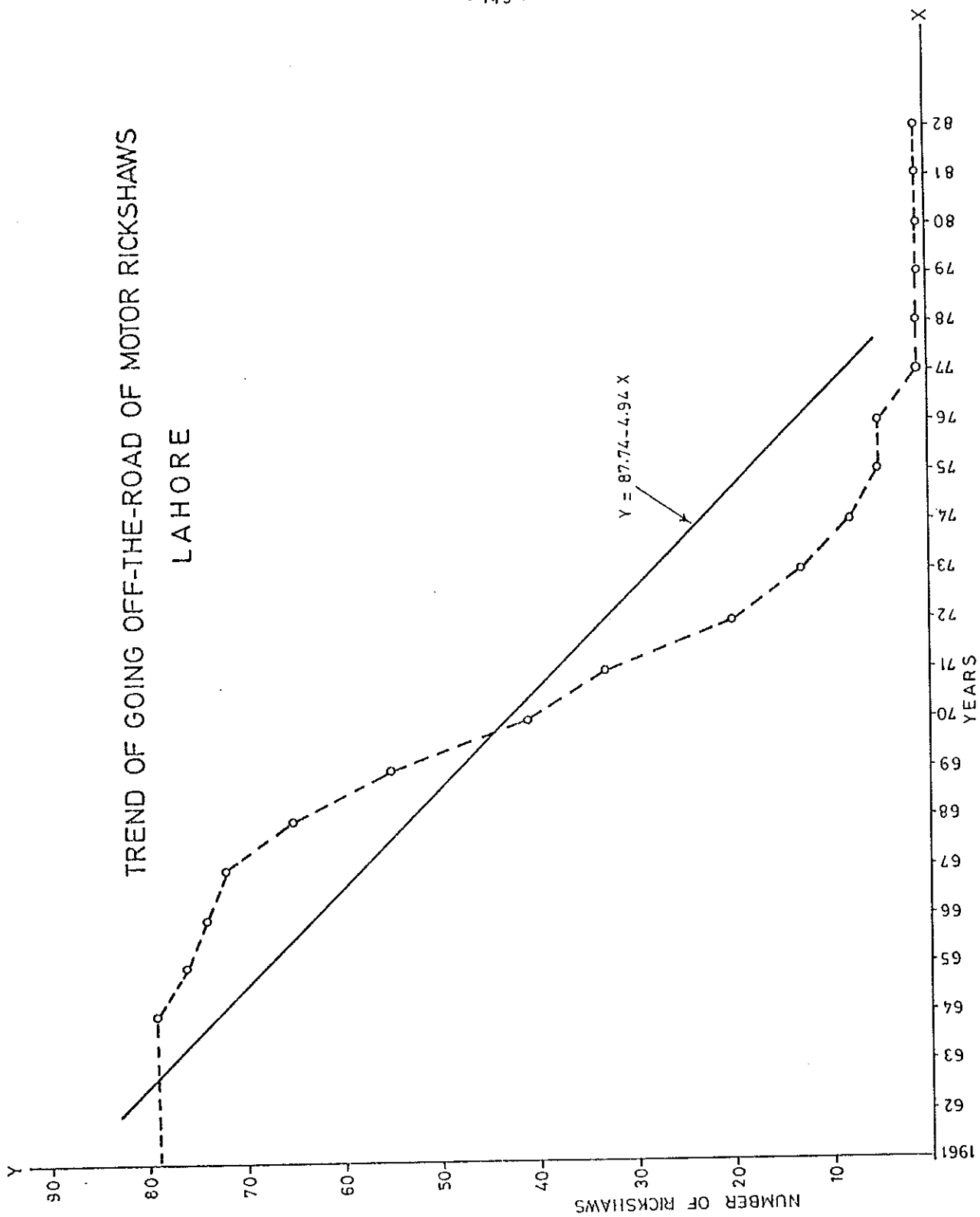


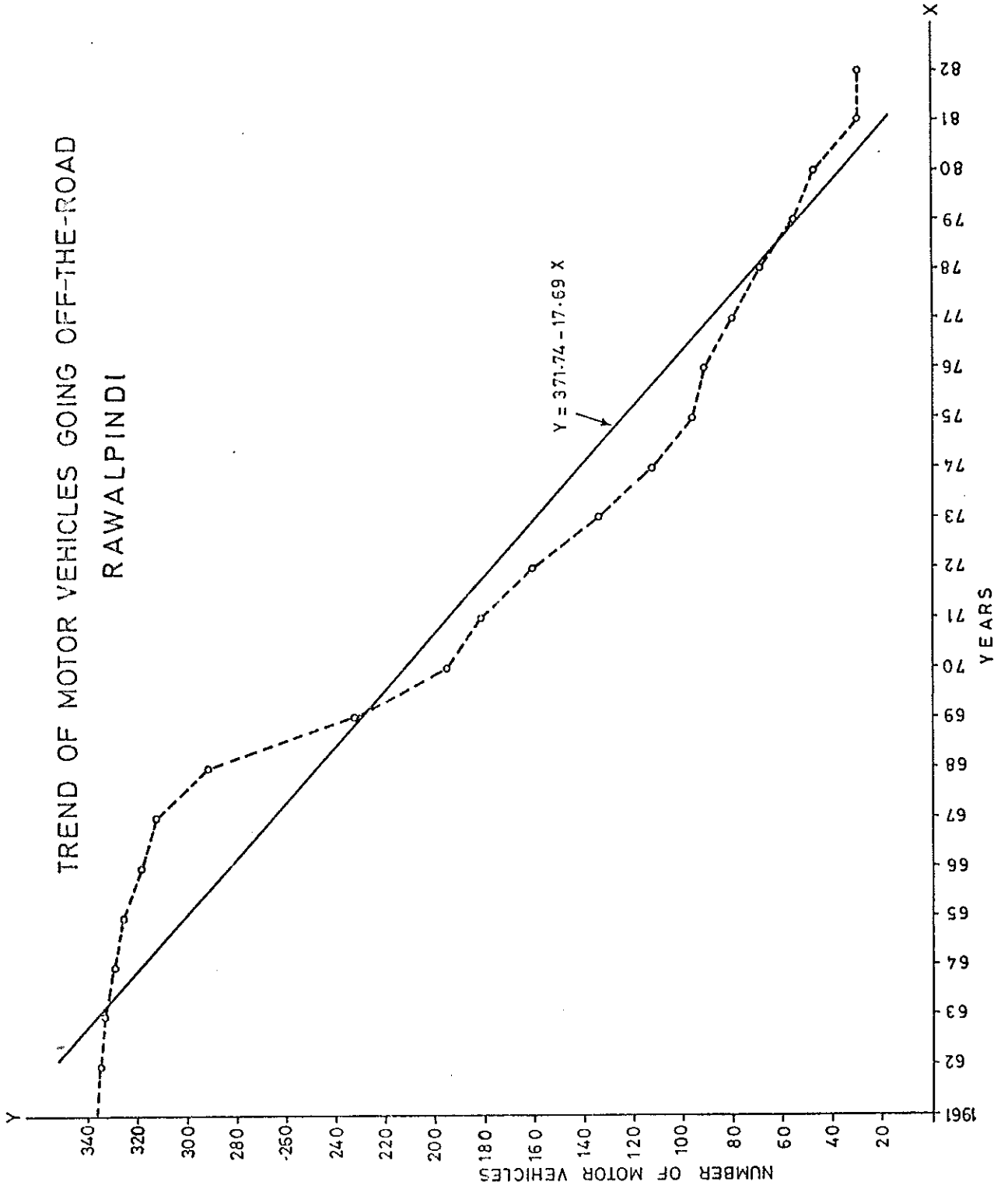


TREND OF GOING OFF-THE-ROAD OF VAN / PICKUP LAHORE

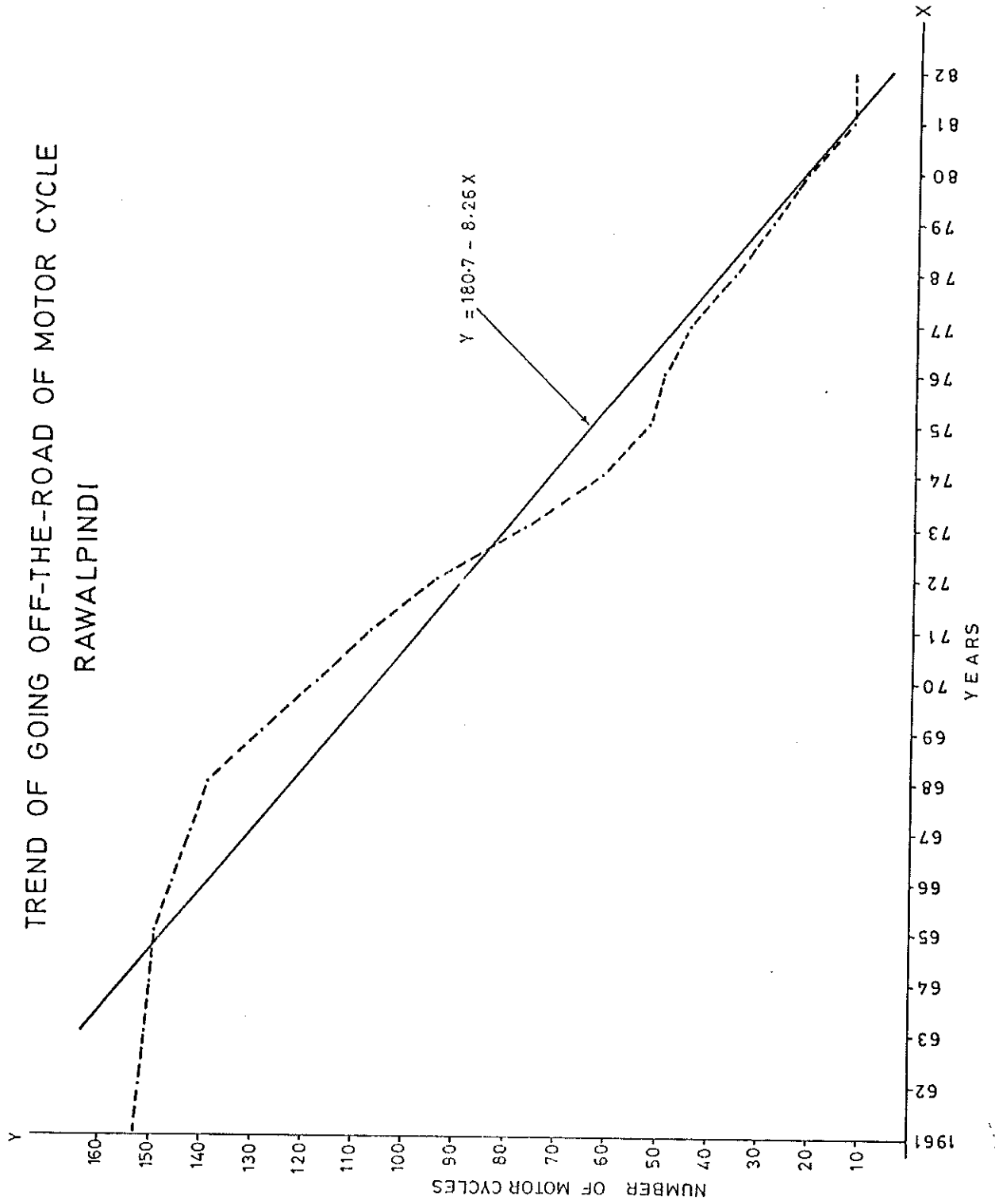


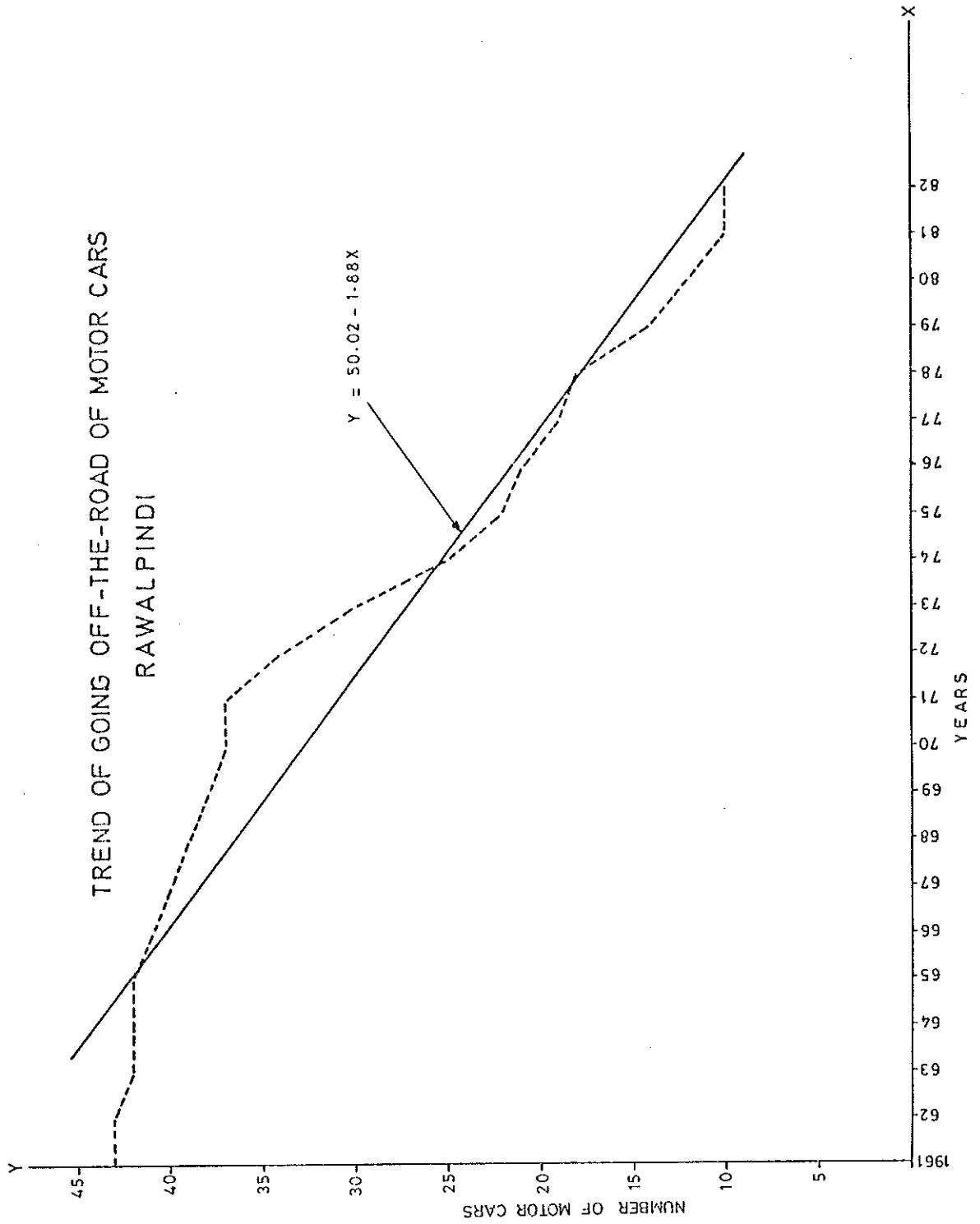
TREND OF GOING OFF-THE-ROAD OF MOTOR RICKSHAWS LAHORE

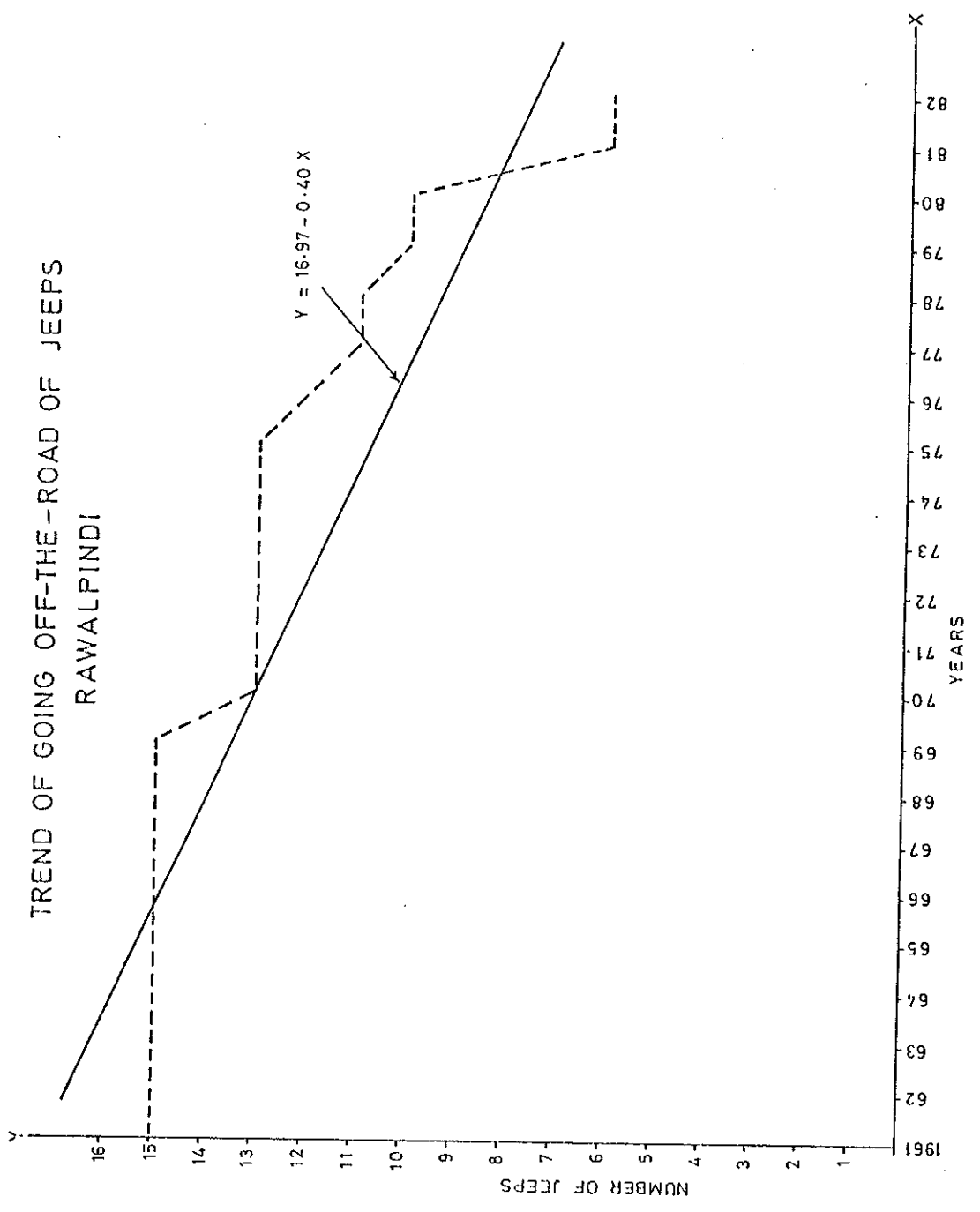




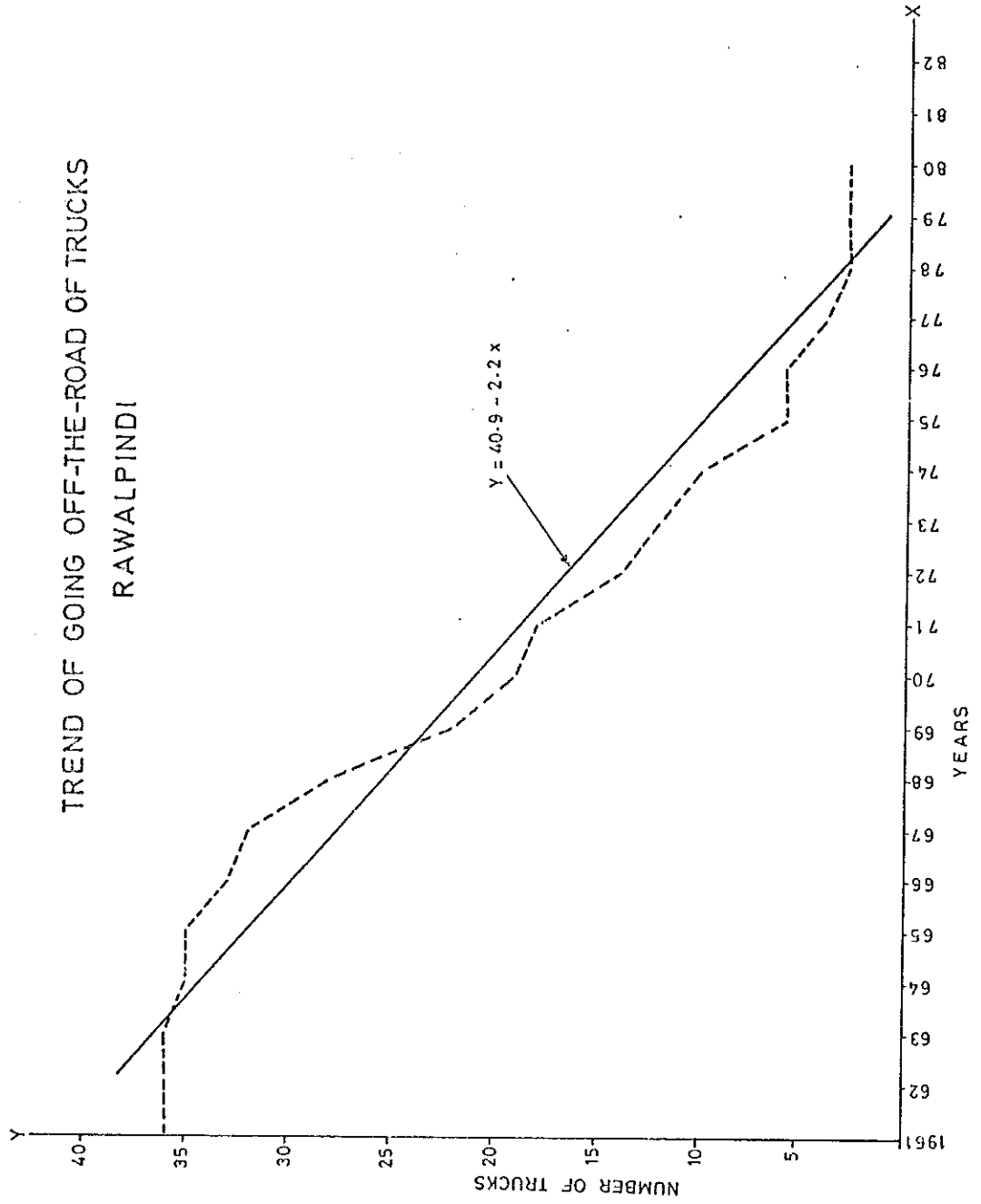
TREND OF GOING OFF-THE-ROAD OF MOTOR CYCLE RAWALPINDI







TREND OF GOING OFF-THE-ROAD OF TRUCKS RAWALPINDI



TREND OF GOING OFF-THE-ROAD OF BUSES (PRIVATE) RAWALPINDI

